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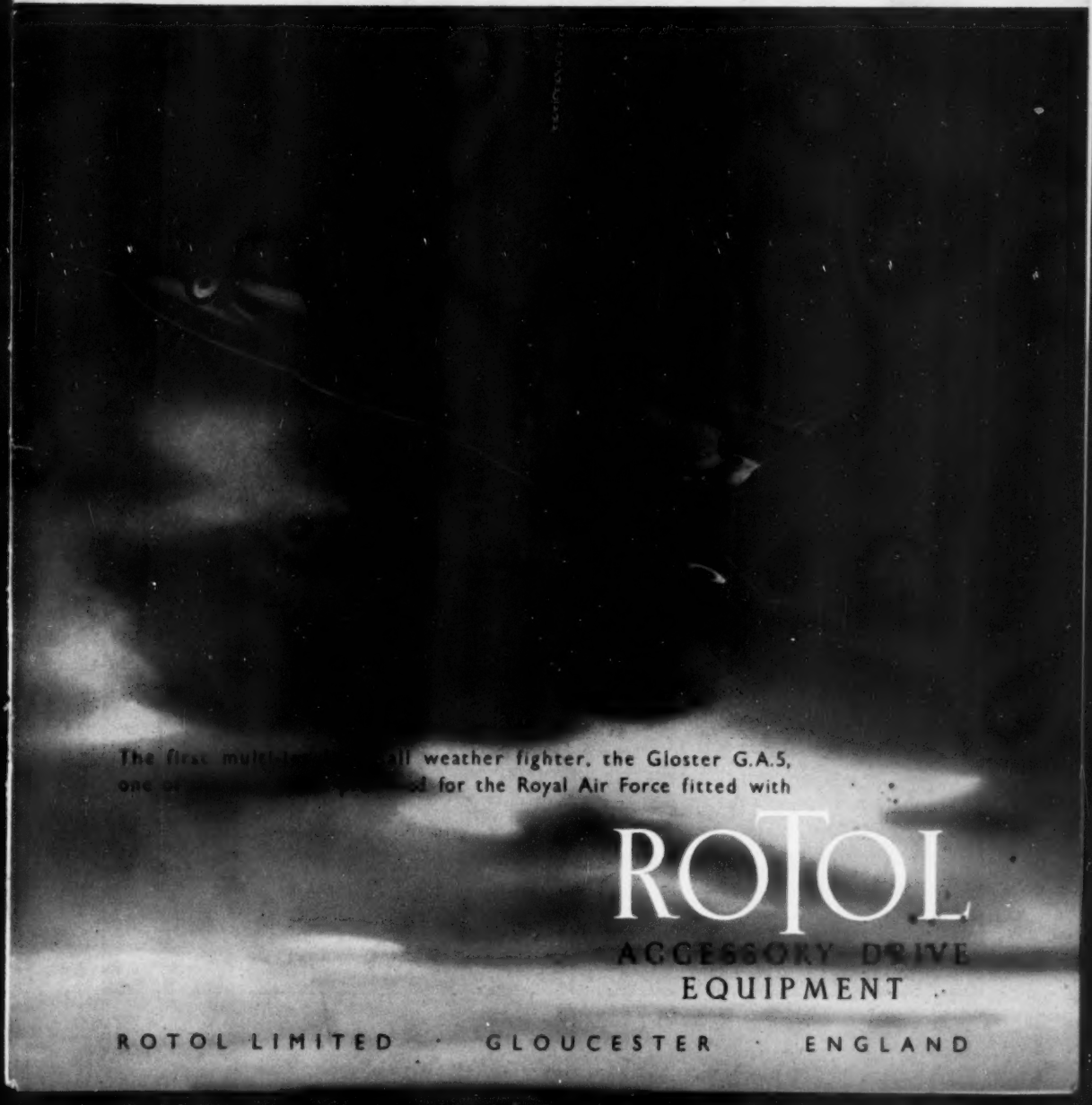

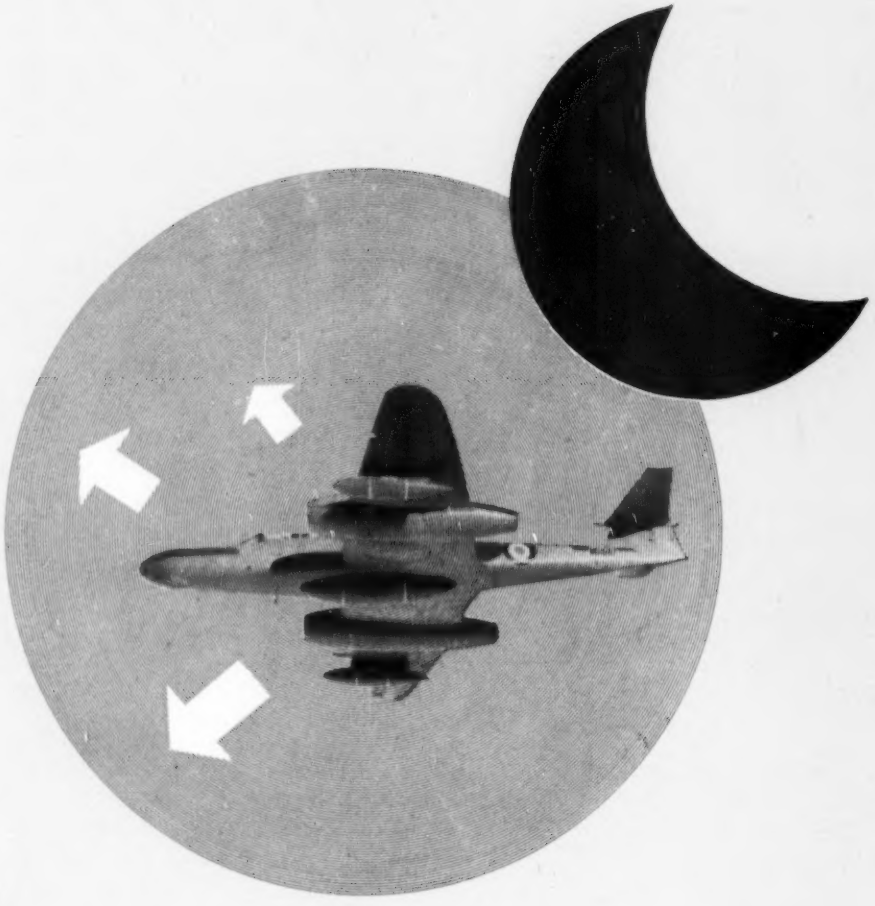

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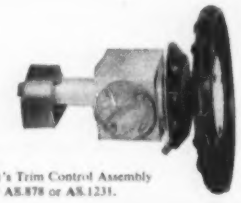

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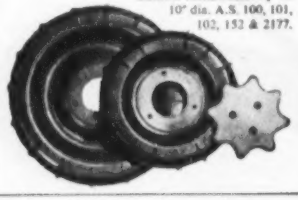

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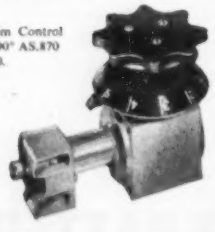

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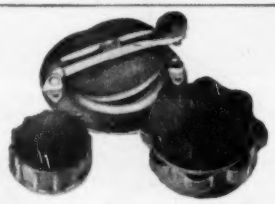

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Everything Under Control

WHEN aircraft gas turbines were first introduced, a great point was made of their simplicity—only one moving assembly, no pistons or valves, and so on. But after ten years of development the new axial-compressor designs, while retaining a certain basic simplicity, are from all other points of view intricate. So far as the levers and instruments in the cockpit are concerned it has been possible to keep gas turbine controls relatively simple, the absence of mixture and pitch levers and supercharger switches being very apparent. Nevertheless, the pilot of a modern aircraft, jet or piston-powered, is still confronted with a large number of dials and controls for power, flying and equipment.

Much has been done in recent years to standardize layouts, improve presentation and make all control levers move in the natural sense; but there is still room for simplification, and on occasions at least (and probably the most important occasions) improvement in this direction will lead to greater efficiency in operation and safety for the aircraft and its occupants.

If only because gas turbines have doubled the range required of aircraft instruments concerned with speed, altitude and rate of climb, methods of presentation and scale-design require reconsideration, as do other characteristics beyond the scope of this article. One profitable line to follow in this connection is that of colour sectors on dials and colour coding of controls and services, for not nearly enough has been done in this respect. Provided that safe operational limits and emergency maxima and minima are clearly indicated on the faces of instruments, it would frequently be unnecessary further to complicate the reading with detailed figures and units, although these would still be provided for test and occasional reference. The practice of using multi-needle dials is satisfactory to a point, but it can very easily be overdone.

On a closely allied subject, we may remark that master switches can be a special source of danger in cases where their operation would deprive an aircraft of, for example, its fuel supply or vital electrical services. Provision must always be made for the human error, particularly in the event of a pilot finding himself in a tight corner.

A word must be added on the subject of helicopter controls. Obviously standardization should be the aim, and the position is still sufficiently flexible for definite decisions to be taken without any great inconvenience to individual designers. At present, it is not clear whether the starboard seat is to become recognized as that for the first pilot. (Among other considerations, such placing would be inconvenient if helicopters are to make normal airfield circuits in conformity with the almost universal left-hand rule.) Nor is there complete uniformity in the motion of the twist-grip throttle fine-control carried on the collective-pitch lever. On some existing machines, flying from the dual position entails a change of hands between stick and collective-pitch lever, and the opposite rotation of the twist-grip to increase power. The additional control of the helicopter necessarily gives a pilot more to think about; and as most helicopters are at best neutrally stable, they need flying all the time. Hovering and landing calls for considerable concentration from even the most experienced pilot; thus, while a change of hands when moving from one cockpit seat to the other should be within his capacity, a reversal of control motions places an unnecessary and undesirable strain upon him and, incidentally, may call for an unnatural movement of his wrist.

Although of point in this particular discussion only so far as method of presentation is concerned, the Decca Flight Log deserves mention because the advantage it offers to the pilot is *pictorial* presentation. It is so much easier—even for one practised in the art of reading instrument dials—to comprehend a picture display instantaneously, for the mental processes involved are a great deal more direct than are those inseparable from the translation of instrument readings. We are not suggesting that pictorial presentation is generally applicable to the normal instruments to be found in a modern cockpit, but the above reference to coloured sectors implies a step in the right direction. It is, of course, a complex subject about which many people strongly hold divergent views, but few will gainsay the wisdom of keeping everything as (apparently) simple as possible.

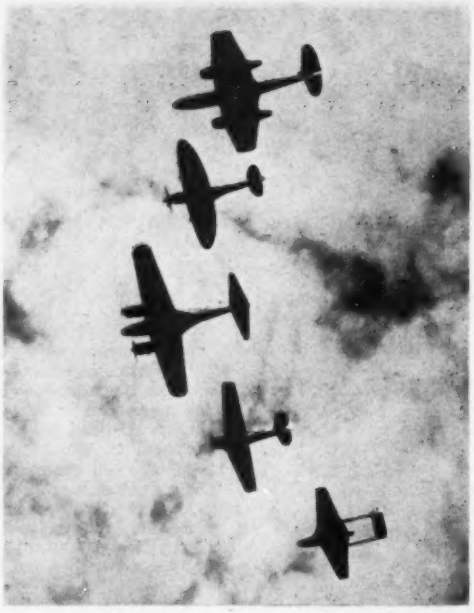
C. F. S. CELEBRATES

Fortieth Anniversary of a Famous Unit

FORTY years ago military aviation was in its infancy, and any Service unit which can trace its origin to 1912 is assured of a place in history. No R.A.F. establishment has a finer pedigree than our own Central Flying School, which is unique in having retained the same title since its formation on May 13th, 1912. The anniversary was commemorated last week by a demonstration of C.F.S. activities, on the ground and in the air, at Little Rissington, Gloucestershire, which has been the home of the School since 1946.

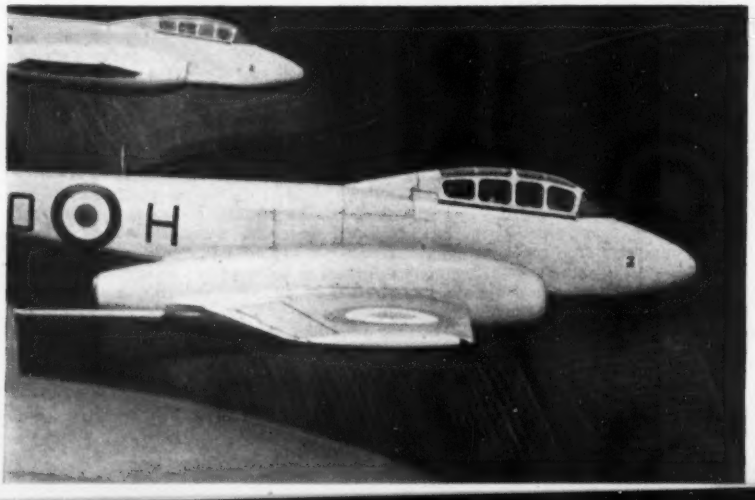
Now commanded by A. Cdre A. D. Selway, D.F.C., the School is training twice as many flying instructors as it did two years ago. To meet this increased demand, the R.A.F. has reintroduced the war-time "creaming-off" policy of posting outstanding pupils from advanced flying schools to C.F.S. for training as instructors. These pilots (there are about ten in every intake) later instruct for 18 months before joining operational squadrons. The remainder of the courses are made up of suitable pilots, flight lieutenants or below, from all R.A.F. commands, in addition to re-entrants and foreign pilots.

All students take the first half of the course at South Cerney, 22 miles from Little Rissington, where they learn the principles of instruction in Prentice basic trainers. Half the working day at Cerney is spent in the study of science, principles of flight, engines and navigation. Further ground instruction is shared by all students when they transfer to Little Rissington, but here the flying syllabus varies according to whether or not students have been selected as jet instructors. The jet students learn to instruct on Meteor 7s while their colleagues fly Harvards. The latter are also given a few hours' jet experience in Vampires purely for background experience (and to prepare them, as future instructors, for the inevitable question: "What's it like to fly jets, sir?"). All students are tested in the air at the end of their course by an examiner who takes the part of a pupil. If successful, they receive the category B1 or B2. The former grade identifies a capable instructor who has successfully completed the C.F.S. course; the B2 instructor is one who, though capable, is initially on probation and is considered to be in need of guidance in his work. There are two higher grades, A1 and A2, which must be awarded by a member of the Examining Wing (a unit within the C.F.S. responsible for maintaining standards of flying instruction outside the School itself). An instructor becomes eligible for the A2 category when he has completed 200 hours' instruction over a period of at least nine months; in addition, he must pass the Examining Wing's ground and air tests and be recommended by his C.O. as an instructor of considerable ability. The category A1 denotes one of exceptional ability and experience—i.e. at least 18 months and 400 instructing hours—and is also awarded on C.O.'s recommendations subject to completion of the Examining Wing tests.



This impeccable composite formation was presented at Little Rissington by C.F.S. instructors. From the top downwards: Meteor 7, Spitfire 16, Anson, Harvard, and Vampire 5.

Records show that many famous personalities have, in the past, worked at C.F.S. as A1 instructors; their names include those of Whittle, Embry, Garrod, Atcherley (R. L. R. and D. F. W.), Boothman, Walmsley, Fogarty, and Groom. Another A1 instructor—during the war—was Mr. G. R. Ward, the present Under-Secretary of State for Air, who revisited C.F.S. recently to fly a Meteor 7. Many other senior officers were trained or served on the staff of C.F.S. before records were kept, including the present C.A.S.,



(Left) Jet instructors for the advanced flying schools are all trained at C.F.S. in Meteor 7s, two of which are seen in close company above an undulating Gloucester landscape.

(Right) The larger view shows a salute to the Sovereign by 20 C.F.S. Harvards; the smaller is an air-to-air impression from the 10th aircraft in the "E" formation.

"Flight" photographs

"Flight" photograph

Three Percival Prentices from South Cerney demonstrate tied-together aerobatics—no mean feat in basic trainers of relatively low power-reserve.

Marshal of the R.A.F. Sir John Slessor, who was assistant commandant during the first World War. The same post was held, in 1913, by Major H. M. (now Marshal of the Royal Air Force Viscount) Trenchard; his signature endorses the first entry in the unit's Form 161, which C.F.S. proudly claim to be the oldest Service document still in use. This ex-R.F.C. volume, incidentally, records "illegal absences of soldiers" for periods of 28 days or over, and there is a *recent* entry signed by W/C. Trumble, the station commander. But discipline flourishes in surroundings of healthy tradition, and there are still many blank pages . . .

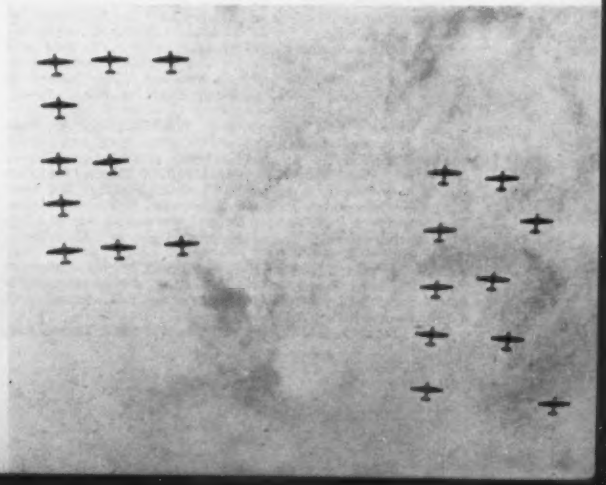
Our visit to C.F.S. last week coincided with the end-of-course aerobatic competitions which periodically enliven station routine. Each flight of the graduating course had nominated two students to fly Harvards or Meteors, according to their training, in a set sequence of manœuvres. Harvard pilots were competing for the Clarkson trophy, first awarded in 1929. One by one, their aircraft completed a loop, slow roll, roll-off-the-top, stall turn and voluntary manœuvre before approaching from 2,500ft with engine cut for a spot landing. Marks were awarded in the following order : 30 per individual manœuvre, 20 for the forced landing, and 30 for the overall impression created by the display (marks being lost for in-sun manœuvring, time-lags, etc.), giving a maximum possible rating of 200 marks. The winner was F/L. K. I. Dolicher, a Polish pilot.

Meteor pilots "aerobatted" in a similar sequence in competition for the Brabyn Trophy, a silver model Meteor presented by a New Zealander, S/L. G. R. Brabyn, A.F.C., who was an instructor at C.F.S. until a few weeks ago. It was finally awarded to F/O. G. G. Farley.

Formation flying has always been associated with C.F.S., whose aircraft formed the Royal cipher "G.R.VI" with such impressive precision at the 1950 R.A.F. Display. On formal occasions such as Battle of Britain Day there is always a call for out-of-the-ordinary formations, and C.F.S. instructors often devote Saturday mornings to the practice which perfection demands. Three interesting formations were demonstrated during the C.F.S. birthday celebrations at Little Rissington last week. First came three Prentices from South Cerney, their wing-tips tied by 12ft webbing strips, to give a fine display of close-formation-flying culminating in a loop—exceptionally difficult in view of the Prentice's comparatively low reserve of power. Expressive of many stages of training, the next formation was of the composite type referred to as a Heinz : it consisted of a Meteor 7, Spitfire 16 (the machine used by Sir James Robb until his retirement recently), Anson, Harvard and Vampire 5. All five kept perfect station, though pilots were obviously working hard to keep together at a speed—some 145 knots—which, for the majority, was either too high or too low for comfort.

A few minutes later we were airborne in a Harvard, observing at closer quarters how C.F.S. pilots apply the golden precepts of formation flying : relax and anticipate. The aircraft was one of 20 which were to form the pattern "E.R."; this salute to our new Queen is to be made during Battle of Britain Week next September and, it is hoped, on other ceremonial occasions. Take-off was in pairs, with aircraft initially grouped in two tens. Our Harvard, last to take off, was No. 10 of the "E" formation, and the pilot, F/L. Hicks, had to cope with heavy slipstream from start to finish. At first we flew behind and below the other nine—three vics with one "in the box." Formation "R" flew to port in two lines astern. Then came the R/T. instruction "Form Easy Roger," and immediately the sky seemed full of milling, skidding Harvards. But the form-up period gave a deceptively complicated impression, and in actual fact lasted only a few seconds; for there we were, 20 Harvards spelling a readable "E.R."—albeit seen mirror-wise and obliquely. Half-span spacing between aircraft was the rule, applied by large movements of throttle- and pitch-levers. In the rear ranks, the process was constant; boost needles flicked back and forth between minus four and plus two and A.S.I.s showed 90-120kt as perspiring pilots strove to hold station. Two runs in formation were concluded by a lively peel-off and stream-landing.

Such a demonstration, though not an integral part of the



"Flight" photographs

Members of 40 Commonwealth and foreign air forces have been or are being trained at C.F.S. Among them (left) are P/O. Kyan Win (Burma), Lt. Enzo Cauda (Italy), and F/O. Basil Leong (Malaya); they are congratulating F/L. Dolicher (second from left, and originally of the Polish Air Force), on winning the Clarkson Trophy for Harvard aerobatics. In the right-hand picture, F/O. G. G. Farley receives from the Commandant, A. Cdre. Selway, the new Brabyn Trophy, now awarded to the best aerobatic pilot in each Meteor course.

C.F.S. CELEBRATES . . .

C.F.S. instructors' daily work, gives them an extra opportunity of maintaining the proficiency expected of so skilled a band of pilots. The instructor today must also be something of a psychologist, varying his approach according to the pupil's temperament, and no longer speaking in the stilted patter of the text-book. Such versatility was certainly apparent in our Harvard pilot, whose lunch-time task was to conduct the station brass band in a mellow selection well suited to the occasion.

The afternoon was given to a brief inspection of the well-equipped ground facilities provided at C.F.S. : Link trainers; cutaway jet and piston engines, instruments and aircraft-systems; miniature wind-tunnel; models; survival equipment; and, in the sick quarters, a decompression chamber. Here S/L. Sharer, the Station's senior medical officer, demonstrated effects of anoxia (deficiency of oxygen in the blood) up to an equivalent height of 27,000ft, at which his hands trembled, his face took on a reddish-blue tinge, and his speech became laboured. The primary purpose of the chamber, he said, is to test the effects of "bends" and decompression-sickness on potential jet pilots at heights of up to 38,000ft. Results are correlated and forwarded to the Institute of Aviation Medicine at Farnborough. The ground exhibits at C.F.S., no less than the flying displays, all convinced observers that this distinguished unit is as modern as the hour, tradition notwithstanding.

That tradition is well defined in an Air Ministry Order as "a major factor influencing R.A.F. efficiency in peace and war" and the task of the C.F.S., its guardian, is "to train flying instructors who, by their skill, knowledge and enthusiasm will raise the flying efficiency of the Royal Air Force." Though originally formed to train all pilots, C.F.S. has taught instructors only for the past 32 years. But the pioneering spirit has remained constant. R. B.

FROM ALL QUARTERS

Statement on Air-Transport Policy?

A HINT that the Government's general policy on civil aviation would be announced shortly was given in the House of Lords on May 13th by Lord Leathers, Co-ordinating Minister for Fuel and Transport. He had been asked by Lord Pakenham, the former Minister of Civil Aviation, whether the Government had given, or intended to give, any new directive to the Air Transport Advisory Council regarding the respective activities of the Air Corporations and the charter companies.

Lord Leathers reminded the House that the Advisory Council considered applications from independent air companies to operate scheduled services as associates of the Corporations, and advised the Minister of Civil Aviation on the acceptance or otherwise of such applications. The Council discharged its duties under a directive from the Minister. The directive at present in use was the one issued by Lord Pakenham when in office.

The directive had, however, been modified in one respect—by Mr. J. S. Maclay when he was Minister of Civil Aviation : It had been decided that, for the time being, agreements coming up for renewal should not be accepted beyond March, 1953, nor should new agreements be granted extending beyond that date. This was a temporary measure while policy was under review. The directive to the Advisory Council was among the questions which the Government were examining as part of their review of policy.

Lord Leathers added that, in respect of the Government's intentions, Lord Pakenham should "await the general statement on the future policy of the Government for civil aviation which will be made a little later."

Lord Pakenham said that he and many of his colleagues were becoming extremely restive, and were beginning to feel that civil aviation was being treated as the "Cinderella" of the Departments. He could only hope the new Minister would prove to be the "Prince Charming" for whom a great many were looking.

Straws in the Wind

FORESHADOWING, perhaps, the expected outline of the new air-transport policy, by which independent firms may operate services alongside those of the Corporations' trunk routes, important news leaked out last week-end concerning a joint venture between two leading charter operators, Airwork, Ltd., and Hunting Air Travel, Ltd., whereby a Viking service may soon be operated between England and Nairobi. Both concerns, which have had extensive experience of flying along this route, have hitherto been regarded as keen rivals, so the new move is significant.

A great deal of "information," much of which appeared to be purely speculative, appeared in various newspapers last week-end. We understand that the only firm news is that the service is "under consideration" : the two companies have expressed their wish and ability to run it, and, at the moment of writing, the proposal lies somewhere between the Air Transport Advisory Council (whose task it is to advise the Minister of Civil Aviation on such matters), the M.C.A., and B.O.A.C.

The intention—an admirable one—is to provide a service complementary to those already available, i.e., a low-fare, short-stage run, in reasonable comfort, alongside the high-speed Comet service to Africa and the normal B.O.A.C. Hermes services. A frequency once weekly in each direction has been mentioned, but we understand that no final decision has yet been made on this point; nor has the British terminal airport been named.

Fortieth Wilbur Wright Lecture

THE Wilbur Wright Memorial Lecture is generally regarded as an occasion in aviation, and a fitting climax to the many lectures presented during the winter and early spring. This year's paper will be presented by Sir Harry M. Garner, C.B., M.A., F.R.Ae.S., Chief Scientist, Ministry of Supply, under the evocative title *Prophecy and Achievement in Aeronautics*. A large audience is foreseen for this classic lecture—the fortieth in the series—which is to be held, as usual, under the auspices of the Royal Aeronautical Society. The venue is the Institution of Civil Engineers, Great George Street, London, S.W.1, at 6 p.m., on Thursday, May 29th.

A Model's 105 m.p.h.

SUBJECT to confirmation by the Models Commission of the F.A.I., a new world speed record of 105 m.p.h. for a model aircraft powered by a 2.5 c.c. engine was established last Sunday by Peter Wright of the St. Albans Model Aero Club. He was competing in the eliminating trials held by the Society of Model Aeronautical Engineers at R.A.F. Station Chigwell to select a British team for the World Control-line Model Championships to take place at Melsbroek Aerodrome, Brussels, in July.

Mediterranean Forecast

PREDICTING that the N.A.T.O. commander-in-chief in the Mediterranean will be not a soldier nor a sailor, but an airman, G/C. Hugh Dundas says in the *Daily Express* that such a choice is strongly favoured at Supreme Allied H.Q.

"If hot war started," he writes, "the Mediterranean admirals would have their work cut out defending themselves from stray jet bombers and at the same time keeping the sea supply lines open.

"There is only one element which spans the whole area. That element is the air. The navies and the armies alike will be hamstrung unless they have land-based air power to support them.

"That is why an air supremo is an obvious choice for the Mediterranean. It is not only good strategy. It is also a sensible way of solving the political differences and of soothing the national prides and prejudices which have made this problem the most thorny that N.A.T.O. chiefs have yet had to solve."

Malayan Helicopter Plea

IT is believed the authorities concerned in the struggle against the Communists in Malaya have put in a strong plea for the provision of a considerable helicopter force, naming as a target figure three squadrons of eight aircraft each.

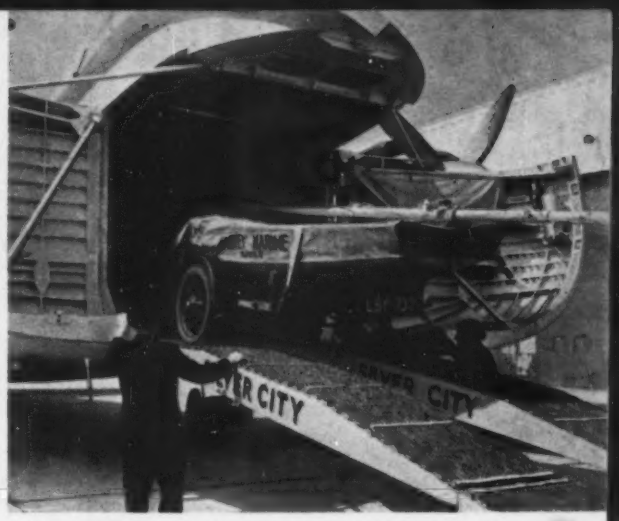
Asked to comment on this, Air Marshal Sir Francis Fogarty, C.-in-C. Far East Air Force, said: "The Air Force would gladly operate more helicopters on behalf of the security forces if the supply and development position permitted them to be sent to Malaya in any numbers. Personally, I think anything we can do to lighten the hardships of travel through the jungle by the ground forces would be an excellent thing, in addition to the obvious technical benefits of using such aircraft. It would plainly be valuable if we could deliver 10 or 20 fresh fighting men to a remote jungle area by helicopter with no previous warning of their movement."

Business Odyssey

THE portrait reproduced here is of a man particularly well known (and well liked) in the aviation industry over very many years—Capt. K. J. G. Bartlett, sales director of the Bristol Aeroplane Company, Ltd. He has just left England on a 22,000 miles round-the-world business trip by normal airline services. The main purpose of his tour is a visit to Japan for general market research; he is to spend eight days in Tokio to survey prospects in the aviation industry.

En route to Japan, Capt. Bartlett will visit Karachi to discuss points arising from the operation of Bristol Freighters by the R.P.A.F., and after leaving Tokio he will return to England through Canada, calling on the Bristol engines organizations in Vancouver and Montreal and the Bristol Aeroplane Co. of Canada, Ltd. He will thus bring his post-war mileage total on "Bristol" business trips to well over 100,000 miles, including, in recent years, some 60,000 miles flown in Bristol Freighters on oversea demonstration tours.

Capt. K. J. G. Bartlett



FIREFLY BY FREIGHTER: The thousandth Fairey Firefly sailing dinghy to be built at Hamble being loaded into a Silver City Bristol Freighter at Eastleigh, Southampton, as mentioned in the paragraph below.

Triphibious Tourism

AN original "triphibious" operation was executed last Friday by Silver City Airways and the Fairey Aviation Company, through its subsidiary Fairey Marine, Ltd., of Hamble, Hants, to prove how quickly and easily small sailing dinghies can be flown to France for a day's racing, or for export to overseas buyers. But this was no ordinary dinghy, for *Nono* is the 1,000th Firefly-class boat built by Fairey Marine in five years—a record for any boat-builder. With it to Cherbourg went helmswoman Jennifer Alexander.

Dismantled and mounted on a road trailer, a Firefly dinghy measures only 15ft long, 6ft 6in wide and 4ft 9in high. This is about the same as an average 12 h.p. car, which means that it can be flown to France for £12 on Silver City's Lympne to Le Touquet service, or £15 on the Southampton-Cherbourg or Southend-Ostend air ferry. In the case of an export boat, this works out considerably cheaper than surface transport, as no special crates or packing are needed and the fare includes full insurance cover from take-off to touch-down (surface carriers charge up to 33⅓ per cent extra). And, of course, on a normal trip in search of a day's sport, boat, trailer, car, owner and passengers can all travel on the same aircraft.

Vickers' Board Appointments

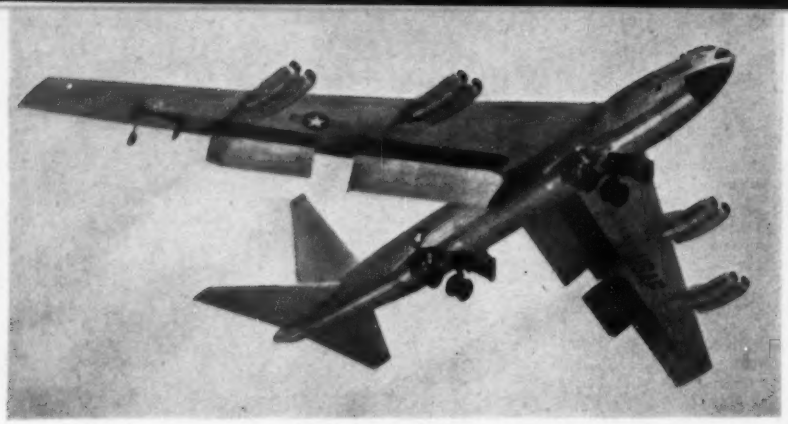
FOLLOWING the relinquishment by Commander Sir Robert Micklem, C.B.E., of all his various offices in the Vickers' organization and his subsequent death on May 13th, it is announced that the following appointments have been made by Vickers-Armstrongs, Ltd.:—Sir James Reid Young, C.A., F.C.I.S., to be chairman; Maj.-Gen. C. A. L. Dunphie, C.B., C.B.E., D.S.O., to be managing director, engineering works and shipyards; and Mr. E. J. Waddington, A.C.A., to be director of administration.

All three were already directors. Major Sir Hew Kilner, M.C., continues as deputy chairman and managing director of the aviation side of the business.

The Comet and D.M.E.

REFERRING to a passage in a recent *Flight* article on the Comet, in which crew-criticisms of D.M.E. were quoted, Ferranti, Ltd., state that, if the remarks were taken to refer to the Ferranti 1,000 mc/s equipment, they would be inaccurate. The firm says that this equipment has flown a considerable number of operational hours, and that on no occasions have there been any doubts on the questions of range, identification or aerials. Installations have been flown in Ministry of Supply Comet aircraft by G/C. John Cunningham with quite satisfactory results as far as the limited experiments allowed, but, due to the fact that it was impossible to manufacture beacons for installation along the Comet route before the services began, B.O.A.C. crews have, up to the present, had no experience of the equipment.

Ferranti add that the British and American governments have from the very beginning agreed to develop this equipment and to support each other on the installation of the system in 1954. Whereas an American manufacturer can obtain orders for the whole of the American continent from his own government, the British manufacturer has the problem of selling to many governments before he has a worth-while production run.



BIG—: Even with wheels and flaps down the mighty Boeing YB-52 still retains much of the functional beauty of all thoroughbred aircraft. Note the "double-bicycle" landing gear with diagonally offset stowage; the inner and outer flap sections, operable independently and separated to provide a clear path for the efflux from the inner engines; the short bomb-bay; and the high-aspect-ratio ailerons, which look interesting.

HERE AND THERE

Jet Joy-rides

AT a return fare of £36, South Africans are booking Comet flights from Johannesburg to Livingstone (650 miles) and returning by another aircraft the same day, just for the experience of a jet airliner flight.

Helicopter Postponement

THE Coupe Stemm helicopter competition in Paris, originally fixed for May 25th, has been postponed until September 28th.

Austers for Japan

LAST Friday Auster Aircraft, Ltd., shipped the first post-war British aircraft—an Aiglet—to Japan. The Sino-British Engineering Corporation of Tokyo have been appointed agents, and other orders—including one for an Autocar—are in hand. Austers claim that their aircraft are now operating in 75 countries.

Consolidated-Kaiser-Frazer ?

ACCORDING to a statement by Floyd Odlum, president of Consolidated Vultee, his firm is negotiating with the powerful Kaiser-Frazer Corporation with a view to a possible merger. The idea grew out of proposals to modify and maintain B-36s at the vast Willow Run plant of Kaiser-Frazer; the factory was found unsuitable for the purpose, but "satisfactory for smaller types and numerous other kinds of work."

Adopted

AFTER extensive testing, both statically and on dummy and live drops, the Irvin barometric parachute-release has been standardized for R.A.F. harnesses. The necessary modifications are now being made to equipment on stations.

Canadian Defence Appointment

FOLLOWING the resignation of Mr. F. L. Trethewey, Mr. Donald C. Markey has been placed in charge of the contracts and purchasing activities of the Aircraft Division of the Department of Defence Production, Ottawa.

The Fruits of Research

ILLUSTRATED on this page, the Boeing YB-52 and the Convair YB-60 represent the outcome of the biggest pre-flight effort ever demanded by any aircraft type. Following acceptance trials, an even bigger effort will be needed to tool up for one, or both, aircraft; neither type is likely to be seen in numbers before 1954 at the earliest. Dimensionally the Boeing is the smaller: span, 185ft; length, 153ft; height, 48ft, against the Convair's figures of 206ft, 171ft and 50ft. All-up weights will probably be of the order of 330,000 and 360,000 lb, respectively while, with some 80,000 lb thrust available from eight Pratt and Whitney J-57s, performance for both aircraft may exceed that of any other bomber so far announced.

Eglinton's Display

ORIGINALLY announced for June 26th, Air Day at R.N. Air Station, Eglinton, Northern Ireland, is to be held on Saturday, June 28th.

American Way

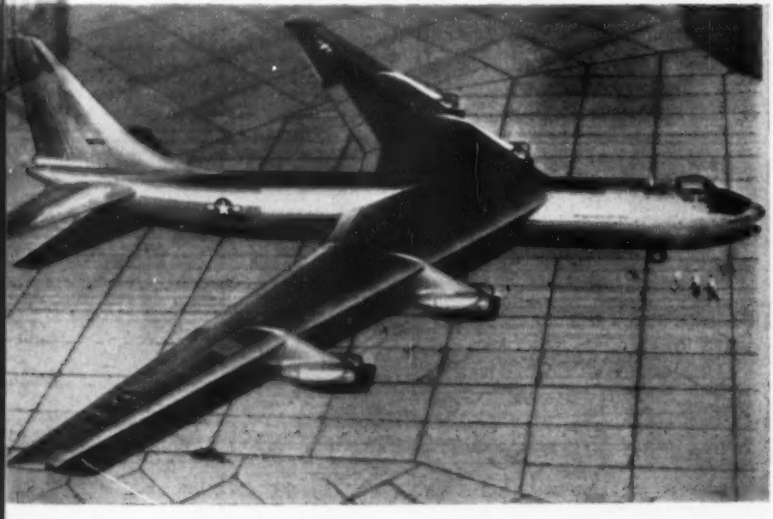
AFTER a U.S.A.F. F-84 Thunderjet from Manston had caught fire and fallen into the sea last week—the pilot baled out and was rescued—all aircraft of this type in Britain were grounded until inquiries into the accident had been completed. This is, apparently, a usual procedure in the U.S.A.F.: a short time ago all F-84s in this country were grounded—for just 20 minutes—for a check on ejector-seats.

Adding Lightness

SOMETHING like 1,000 technicians from M.o.S. establishments and the industry visited the recent exhibition organized at Farnborough by the S.B.A.C. Weight Control Panel, at which 133 examples of weight-saving design were displayed. Citing typical approaches to the problem, the S.B.A.C. quotes the fractional shortening of rivet shanks to give a slightly smaller head: as there may be two million rivets, weighing about a ton, in a 140-ton aircraft, such shortening can save as much as 200 lb.

New U.S.A.F. Rank Titles

A RECENT survey made by the U.S.A.F. disclosed that about 70 per cent. of its enlisted strength was in N.C.O. grades. This was largely due to the fact that a man's pay could be increased only by raising his rank, and skilled technicians required a rewarding rate of pay. The inevitable result was that the disciplinary authority and prestige of the N.C.O.



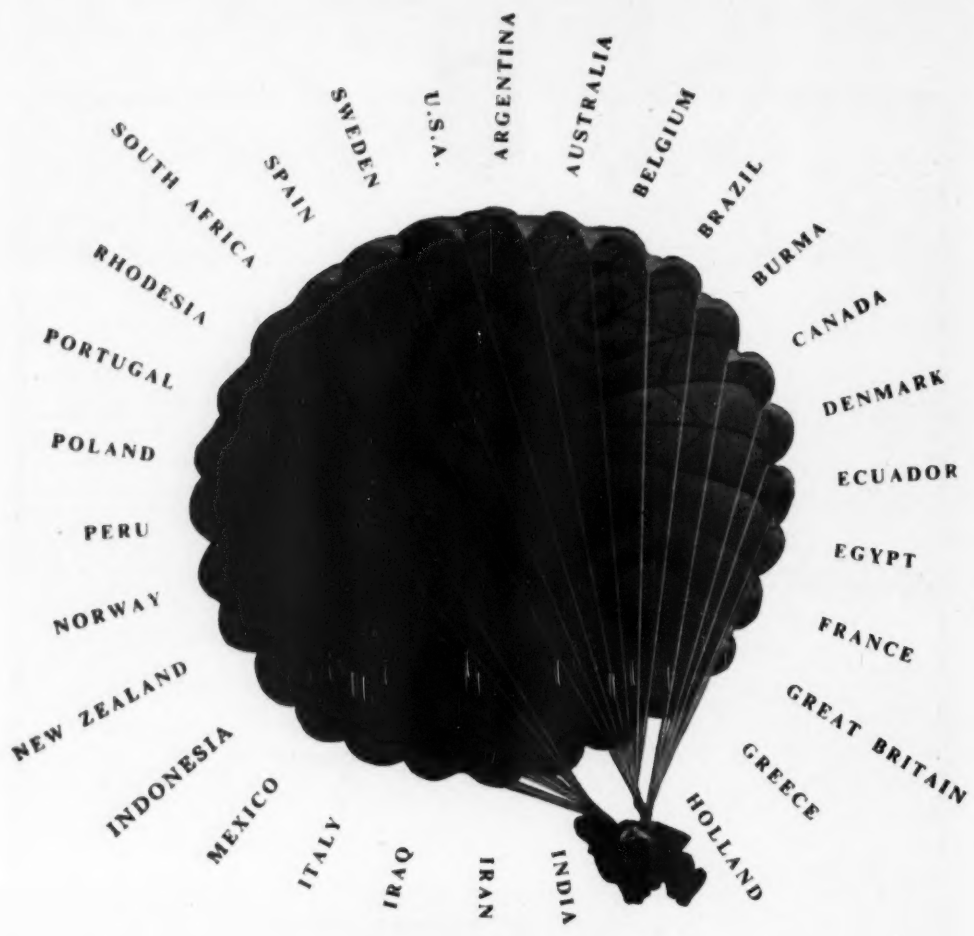
—AND BIGGER: Similarly powered to the YB-52, the Convair YB-60 is even larger. Compared with the B-36, of which it is a development, the new bomber shows a swept wing of reduced span, in conjunction with a longer fuselage and bigger tail. Both the new bombers are the subject of a paragraph on this page.

"SUPER-PRIORITY"

Both the bombers and two of the latest replacement fighters selected for quantity production under the R.A.F. re-armament programme are powered by Rolls-Royce Avon Engines.

ROLLS-ROYCE
Aero
ENGINES

FOR SPEED AND RELIABILITY



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HERE AND THERE . . .

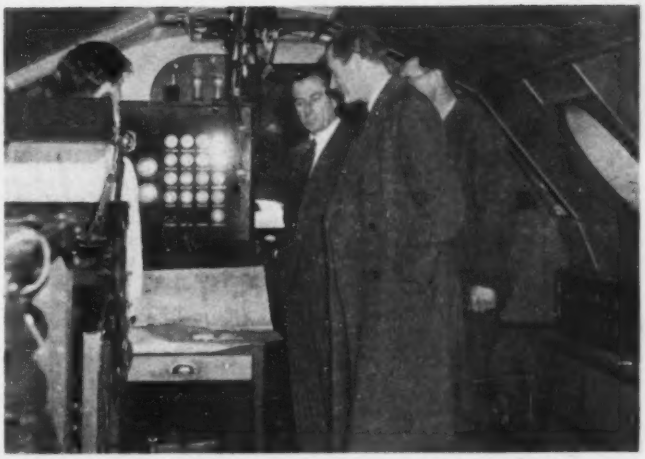
tended to fall. In future, privates, pfcs (privates, first class), corporals and sergeants will be known as airmen fourth, third, second and first class, respectively. They will cease to wear stripes, but will eventually be authorized to wear new insignia. The only N.C.O. ranks will be the present senior sergeants—staff, technical and master—who are unaffected by the change.

Design Courses at S.G.T.T.

THREE special short courses, primarily intended for design staff, are to be held by the School of Gas Turbine Technology, Farnborough Place, Farnborough, Hants, this summer. Dates and subjects are: June 30th-July 4th, Theory and Design of Compressors; July 7th-11th, Combustion and the Design of Heat-exchangers; July 14th-18th, Theory and Design o Turbines.

U.S. Navy Aircraft

DELIVERY of aircraft to the U.S. Navy is scheduled to rise to a steady value of 300 per month by the end of the 1953 fiscal year. Announcing this recently, Mr. Dan Kimball, Secretary to the U.S. Navy, said that all long-range fighters now coming into naval service would be able to carry small atomic bombs. "Moreover," he said, "we have modified a sizeable number of our fighter and attack aircraft already built, or building, to achieve the same capability." He went on to say that the larger atom bomb could be carried by some aircraft now in carrier service—presumably the AJ-1 Savage—and that a greatly improved attack aircraft, the Douglas A3D, was now in production.



FLIGHT-DECK OF THE SAUNDERS-ROE PRINCESS—packed with test equipment—is inspected by the Minister of Supply, Mr. Duncan Sandys (nearest camera), during a recent visit to Cowes. With him are Mr. Geoffrey Tyson (chief test pilot) and—only partly visible—Capt. E. D. Clarke (managing director). The launching date is now only a month or two distant.

IN BRIEF

THE Trinidad, B.W.I., office of the Air Registration Board has now moved to Glamorgan, Gordon Street, Curepe.

* * *

Boulton Paul Aircraft, Ltd., announce a net profit of £94,022 for the year ended July 31st, 1951 (previous year, £71,092). The board has recommended payment of a dividend of 7½ per cent, with bonus of 2½ per cent, both less income tax at 9s. 6d.

* * *

Dunlop's net profit last year was £4,607,413 as against £5,062,863 the year before; the group trading balance was £17,869,124, as against £17,580,500. Dividend and bonus, of 17½ per cent, remains unchanged.

* * *

Dr. Paul D. Merica, identified with the research activities of International Nickel in Canada, Britain and America since 1919, has been elected president of the International Nickel Co. of Canada, Ltd. Dr. John F. Thompson becomes chairman, Mr. R. Leslie Beattie general manager, J. R. Gordon assistant vice-president and William F. Kennedy secretary.

* * *

Following the retirement of Lt-Col. K. G. Maxwell, M.C., M.I.E.E., publicity manager of Metropolitan-Vickers Electrical Co., Ltd., Mr. E. E. Walker, M.I.A.M.A., has been appointed to the post.

* * *

Mr. L. C. Bingham, general sales manager of Venner, Ltd., left England last Friday for business visits to The Hague, Arnhem, Rotterdam, Oslo, Stockholm, Copenhagen, Brussels, Ghent, Paris, Barcelona and Oporto.

* * *

Pathé Pictorial No. 399, at present at cinemas in various parts of the country, contains shots of the weighing of a Lancashire Aircraft Corporation York by means of one of the B.O.A.C. hydrostatic weighing units. Kenton Equipment, Ltd., London W.1, are the sole world distributors for this equipment.

THIS WAY OUT: The drastic-looking performance on the left was photographed during a U.S. demonstration of old and new types of fuselage-blister design. A master-sergeant in a B-50, using an axe and his boots, hacked his way out of the blister; then the new type of blister, seen below, was demonstrated. The gunsight (which directs the adjacent armament by remote control) was first unshipped, and then the quick-release cam-attachments of the frame were operated, and the whole blister pulled inwards, leaving an unobstructed emergency exit.

PLASTICS IN AIRCRAFT

Recent Progress in the Development of Major Components and Structures

REGARDED from an historical point of view, the entry of plastics into aircraft is generally presumed to have taken place in the 1930s, when acrylic resins in thick sheet form were first employed for windscreens and, later, for canopies, gun turret glazing, etc. In actual fact there was a prior, and a surprising, application—the use of transparent cellulose-acetate sheet in place of fabric to cover the wooden structure of wings and fuselage and so to produce an "invisible" aircraft. This was achieved both by the Germans and the French about the year 1917, and served some small use for artillery spotting. While it was not really invisible below 2,000ft such an aircraft was very difficult to see above this height and was definitely a very difficult target to hit. With later, more powerful, aircraft, such structures were useless.

The poly-methyl methacrylates (the British variety is known as "Perspex") are now general for canopies and also for radomes, and while the simple methacrylate structure was the earliest form, modifications have been employed to prevent cracking at fixing-points. Thus glass-fibre reinforcement is introduced to reduce chances of failure at bolt holes, while success has been achieved in the bonding of a rubber interlayer to metal on the one side and to methacrylate on the other.

While this resin has been widely used for radomes, the increase in aircraft speeds has demanded a much greater strength/weight ratio and high erosion resistance. The last few years, therefore, have seen the development of glass fabric reinforced with polyester resins capable of being hardened at very low pressures. These structures may be used alone or, for the shorter energy wavelengths, may be sandwiched with lightweight cores such as expanded rubber, expanded P.V.C., or honeycomb structures made from P.V.C. or paper impregnated with phenolic resin. Radomes of all types are produced by several of the plastics fabricating companies and, indeed, by a number of the aircraft constructors themselves.

Turning now to the subject of plastics as adhesives, it may first be recalled that during World War I, when almost all aircraft were of wood, glue was an essential part of the structure, and all the glues were of natural origin—the "gelatine" type, from hides, hoofs, bones, etc., and the casein type, from skimmed milk.

The synthetic adhesives made from phenol and urea formaldehyde have, over the past 10-15 years, almost wholly replaced the older types of glue in most of the modern applications of wooden adhesion on a large industrial scale, and came into prominence during the late war for aircraft structure bonding. The most outstanding example of this was the Mosquito, which proved so valuable in service during the latter half of the war.

Nevertheless, since the metal aeroplane had long existed and was obviously to be the transport aircraft of the future, the attention of certain scientists was drawn to the problem of bonding metal-to-metal with synthetic resin adhesives, the prime consideration being the production of a strong bond with the hope that it would replace costly riveting and, for the first time, introduce a really smooth, and thus efficient, surface.

An outstanding worker in this field is Dr. N. A. de Bruyne of Aero Research, Ltd., who introduced the "Redux" process in 1941. This consists in using polyvinyl formvar as the adhesive, employing phenol-formaldehyde as a flux to induce the formvar to "wet" the metal.

The first all-metal aircraft in which this method was employed was the de Havilland Dove, but prior to this, a prototype panel was made and bonded with Redux, and was subjected to 330,000 loading reversals to induce skin wrinkling. The panel was found to be intact after this severe test.

The success of the Redux process has reached its apotheosis in the construction of the de Havilland Comet. The synthetic-resin adhesive is employed in the assembly of the whole fuselage, all wing skin panels, tailplane, control surfaces, etc. In general, the advantages of adhesion compared with riveting are as follows: reduction in weight up to 20 per cent due not only to the elimination of rivets but also to the use of thinner metal sheets; smooth surfaces without the use of expensive flush-riveting; reduction in production costs which approach 50 per cent, and in increased static and fatigue strengths*.

The next logical step in development has led to the consideration of plastics as aircraft structures in themselves. Some idea of the rate of progress in this field can be gauged by remembering that at a lunch during the early stages of the last war, a famous aircraft builder told the plastics industry that plastics were neither strong enough nor stiff enough to be incorporated as aircraft structures. This was so obviously true that the plastics industry accepted the fact; it was true even for the then reinforced plastics made by incorporating strong fabrics and wood veneers. Today, the situation is so much more hopeful that it induced Dr. Megson of the Chemistry Department, Royal Aircraft Establishment, to state: "The days are gone when plastics are used simply for the production of small items in which mechanical strength is of secondary importance, and we are beginning to realize the potentialities of the materials for structural purposes."

The new situation has arisen more specifically because of the development of two very different types of plastic materials during the last 10 years or so.

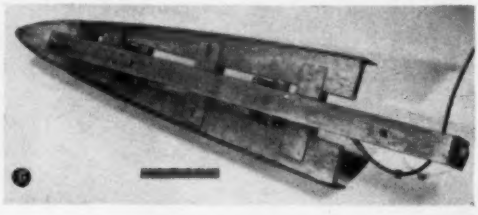
The polyester resins, which were first developed in the U.S.A. about 1941, resemble closely the alkyd resins used for the past 20 years in paints and enamels. They differ considerably from the normal thermosetting resins in hardening at very low pressures and at room temperatures, and when employed to impregnate glass fabric or fibre and built up to form laminated sheet, result in structures of excellent strength and stiffness and of great toughness. The widest development of such glass fibre resin laminates has taken place in the U.S.A. where radomes, boats, fishing rods, washing-machine components, and even small aircraft and experimental motor-cars, have been fabricated. In Great Britain similar lines have been followed, although on a smaller scale. Several boat-building companies are using the material; radomes are fabricated and full-size experimental omnibus roofs have been so constructed. In the field of aircraft construction, the Comet is fitted with three resin-bonded glass-fibre panels in the undercarriage flap as part of the aerial system, whilst air ducts of the same material are also employed. The Ambassador, too, is fitted with large laminates of resin-bonded glass-fibre.

The second new constructional material of special note is that used in the construction of the Delta wing first shown at the S.B.A.C. Display at Farnborough last year, and recently exhibited in the Earls Court section of the British Industries Fair. The basic material is asbestos, and is bonded with phenolic resin to form a felt-like sheet. This aircraft construction is specifically British in conception, having been developed by J. E. Gordon and his co-workers at the Royal Aircraft Establishment. The phenolic-resin reinforced asbestos felt has been developed and produced by Turner Bros, Asbestos Co., Ltd., under the name of "Durestos."

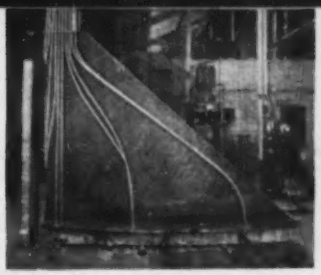
In his paper before the Anglo-American Aeronautical Conference in September, 1951, Mr. Gordon indicated the reasons for choosing this type of material in preference to others for the construction. Since one must use reinforced plastics to obtain the necessary strength and stiffness and since the cellulose types are known to shrink or swell with change of weather, the choice lay between glass-fibre polyester resin and asbestos phenolic resin structures. Because both glass-fibre and polyester resin are comparatively costly, because reinforced asbestos is specifically twice as stiff as resin-bonded glass-fibre, and because of the comparatively short "pot- life" of polyester resin once the catalyst has been added, it was considered that the work at the R.A.E. should be concentrated on the felt type of reinforced structure. It is less strong and less tough than the polyester/glass-fibre structure, but it is stiffer, cheaper, and permits greater ease of moulding.

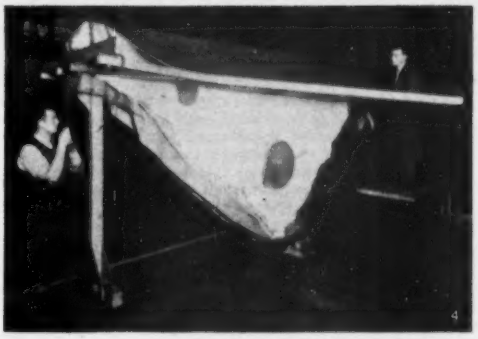
The weights and general performance of such laminates compare well with metal, and cost is considerably less. There are also advantages of surface smoothness, heat and sound insulation and radio and radar wave transparency at low frequencies.

In general terms, it may be concluded that both the new types of material have wide fields of application, each perhaps more applicable than the other for specific purposes.



* *N. A. de Bruyne, "Plastics Progress 1951," p. 147.*





(1) *Construction of the mould begins with the building of a "master" to the exact size and shape of the wing. This master is built up of plaster on an open steel framework.*

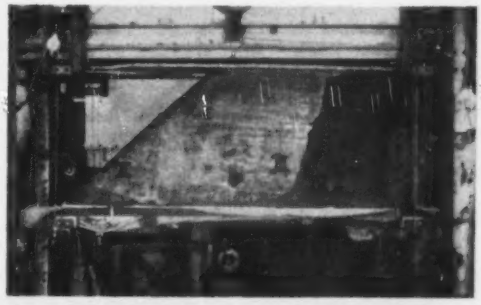
(2) *The master is then coated with sheets of Durestos which, after heat treatment, hardens and, on removal from the master, forms the outer mould for the wing. It is then separated into a detachable inner lining and main body in which heating elements and thermocouples are fitted. Conduit pipes serving these can be seen in the picture, and the mould is completed by building a concrete block around the Durestos lining.*

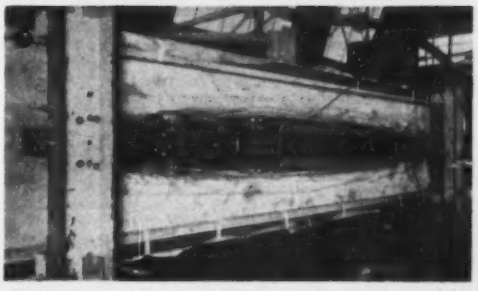
(3) *The next stage is the cutting to shape of the asbestos-felt Durestos sheets before moulding. The man on the left is using a radio-frequency spot-welding gun to "tack" sheets together. Layers of glasscloth and Cellophane are placed between the sheets of Durestos before moulding so that, after curing, the wing can be separated into an inner and outer shell.*

(4) *The cut sheets are then lifted on to a loading fixture—a steel framework which fits roughly into the moulding.*

(5) *Also placed on the loading fixture are a blanket incorporating electric elements, and a rubber sack.*

PROCESSES IN THE BUILDING OF THE R.A.E. PLASTIC WING





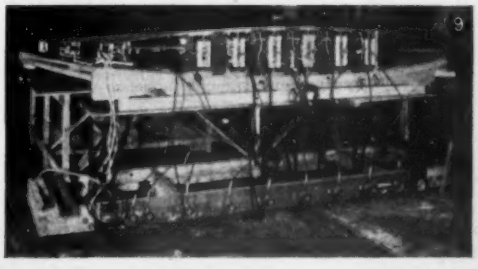
(6) *The loading fixture is then wheeled under the mould and raised so that the Durestos sheets, heating blanket and rubber sack are inserted into the mould cavity.*

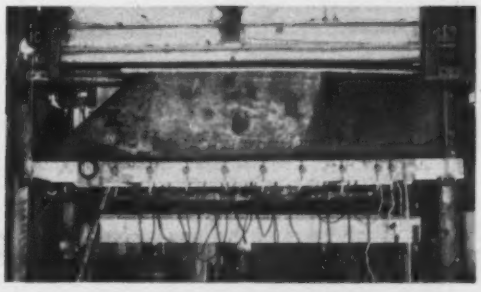
(7) *The edges of the rubber sack are sealed to the concrete mould and the air between the mould lining and the sack is evacuated. Atmospheric pressure thence forces the Durestos sheets against the mould and heat from the elements in the mould and the electric blanket cures the plastic. The vacuum pump also removes the water excreted by the setting Durestos.*

(8) *Expandable wooden jigs, to which metal bellows and airlines are fitted, are inserted into the wing so that, when expanded, they are pressed firmly against the inner surface.*

(9) *The wing, complete with interior fittings, and with the jigs in position, ready for the final insertion into the mould.*

(10) *Both inner and outer shells of the wing, fitted with the interior structure, go back into the mould for the final "cooking" which will make the wing an integral structure.*





Commercial Aviation Commentary

By HENRY MORRIS

A VEIL of secrecy still shrouds the new policy which the new Minister of Transport is presumed to be thrashing out for air transport; though at the time of writing there are indications that something may very shortly emerge. A few people, it seems, have recently been able to lift a corner of the veil, but whether its final removal will reveal a masterpiece or a monster is still problematical. The task of the Minister in producing a scheme which will give greater scope for some degree of private enterprise and eliminate some of the evils of monopoly is comparable with the similar tasks which confront him in his other transport responsibilities—road and rail.

The recent bitter arguments over the powers of the Minister to interfere in the fixing of road and rail tariffs and the opposing views of experts as to whether an increase in surface transport tariffs would improve or worsen the financial prospects of the transport industry, are only too reminiscent of recent arguments in the commercial-aviation element. The Air Corporations Act has aroused much bitter dissension over the ambiguous meaning of certain of its clauses—notably the controversial Section 24—and the varied and often directly opposed views of the airlines themselves on the wisdom or otherwise of offering low-rate fares were only recently reconciled at the threat of an open breach in the hitherto solid I.A.T.A. front.

Evidence so far available suggests the Government's intention is to pursue a very middle-of-the-road policy—although at present the camber seems to be throwing the policy decidedly to the left. The Corporations have been promised by Lord Leathers in the House of Lords that they will be left comparatively undisturbed with their international services, but the wording of his statement left him plenty of room for manœuvre or escape if he wanted it.

* * *

IT now seems that the Corporations are to be more gently and handsomely treated than even they could have hoped for. The framework of the new policy appears to be, in brief:

(1) Corporations to continue to operate their present and planned international services undisturbed.
(2) B.E.A. to relinquish the internal services except (a very big EXCEPT, this) for certain of the main-line and most remunerative routes.
(3) A statutory licensing board to be set up to consider applications for new routes or new types of services.
(4) Scope to be given to private operators over certain routes to develop a new category of passenger service (e.g. a lower-price, slower, short-stage one alongside a Corporation fast through-service).

There has also been some suggestion that air freighting could be left primarily to the private operators *if* they are in a position to exploit this opportunity properly.

If this does, in fact, represent the framework of the new policy, then at this stage it is difficult to commend or condemn it, as its practical implications will depend on the sort of structure that is built up on that framework. The skeleton as now viewed does not hold out much promise for the private operator. Does it mean internal services for independent operators with the plums retained by B.E.A.? Why should a batch of independent companies be expected to convert into profit-making operations the very services which B.E.A. has been bemoaning? No doubt the private operators could reduce the losses on many of these services—but small loss or large loss still remains a loss. However, the so-called "unremunerative" internal routes thrown in with these "dead losses" might present a very different picture, particularly from a longer-term point of view. The assessment of this opportunity to take over the internal services depends entirely on this question of having the sugar with the lemon, and on the ability of the Government to offer adequate security of tenure on these internal operations. Some independent operators suspect that B.E.A., so helicopter-minded, will be quite content to allow a few independents to lose money on internal services for a few years—until under a different Government more favourably inclined to State monopolies, the Corporation can take over the pleasant task of introducing the new "air-buses" which will almost certainly be with us in six or seven years' time.

B.O.A.C. will certainly be happy over the removal of any threat to disturb their existing services or responsibilities. Whether it is possible to offer independent operators any sound opportunity to develop long-haul international flying without some disturbance of B.O.A.C. is highly problematical; but, here again, the implications of the new policy depend entirely on the method of application. If the Minister faced up to the basic requirements for any sound private-enterprise element in the industry, this framework could be developed into a policy of giving plenty of opportunity to all.

* * *

IT seems a far cry from the immediate post-war days when private enterprise in the air business seemed doomed; air transport was looked upon purely as a strategic and prestige necessity which had to be kept alive by costly injections of Government subsidies, so the whole business should be run by State monopolies. Now the main object of all politicians—and of every creed—seems to be to make certain that the Corporations operate at a profit! Yet this new dogmatic target of "profits at all costs" may well prove to be the best tonic the industry could have been given. The Socialists will be happy if their pet concerns do operate at a profit, and will not be so disconsolate if, alongside them, there is also a healthy family of private operators also operating at a profit: it will be useful to have some "bloated capitalists" to blame for any defects in the nationalized affairs! The Tories will feel that they have stood by their promises and manifestos; that by keeping both State and private enterprise in healthy being they have adhered to their sacred principle of "economc competition"; and that if and when they once again hand over the reins to their rivals they will have left a pattern less likely than ever before to revert to its traditional "political shuttlecock" rôle.

* * *

WHATEVER line it takes, the Government must ensure that its new policy contains the two cornerstones which the independent operators (just as much as the Corporations) must have if they are to establish any reliable and lasting operations. These two essentials are, only too obviously, frequently glossed over. First and foremost, the policy must offer such commercial opportunities and security of tenure that new large-scale finance will be attracted to the independent operators. Secondly, some form of Government assistance will be essential over the procurement of aircraft of the right type in adequate numbers with a minimum of further delay. In both these requirements the private operators will expect as much help from the Government as is assured to the Corporations—but not necessarily direct grants.

It may be that by the time these words appear, some official statement will have been made. Whatever happens, the sooner the Government announces its policy, the better. It could then collaborate with all sides of the industry in working out the details of the application of that policy. After all, the Corporations and the independent operators presumably now recognize that they all have their place in the industry and that, rather than waste effort in trying to "eliminate" one another they should co-operate in expanding the British air-transport industry as rapidly as possible. If the Minister will state this as a point in his policy then the way is open for the Corporations and the independent operators to get together and themselves work out "spheres of operation" which will produce the minimum of uneconomic overlapping, allow a degree of economic competition and at the same time give each of them adequate and secure enough prospects to satisfy their "natural ambitions."

CANADA'S AIRCRAFT INDUSTRY

The de Havilland Company—a "Happy Ship" Twenty-four Years Old

PART V

By JAMES HAY STEVENS

THE first two articles (April 14th and 18th) in this series of five gave the overall picture of the Canadian airframe and engine industry as it is today; then the author went on to review the activities of the A. V. Roe and Canadair organizations (May 2nd and 9th), and in this concluding instalment he deals with the work of the de Havilland company.

THE de Havilland Aircraft of Canada, Ltd., is a very bright star in the Canadian aircraft industry. By trans-atlantic standards it is not a large concern, and, perhaps because of this, it gives the visitor an immediate impression of being a "happy ship". This is not to suggest that the other bigger companies are staffed by frustrated malcontents; far from it, because the Canadian industry, as I said in my first article, is full of enthusiasm, energy and optimism—it is simply that the D.H. team stands out even in such good company. The reason for their contentment lies in the consciousness of having climbed to their present position from the post-war slough by their own stout efforts under the inspiring leadership of their managing director, P. C. Garratt. Although there are now over two thousand employees at Downsview the family spirit is still much in evidence right through the factory—management, technical and labour.

De Havillands are the veteran firm of the Canadian aircraft industry, having been founded in March 1928 as a servicing and assembly company for Moths. It is interesting to recall these small beginnings: small in every way, for the original staff was three; the "factory", then at Mount Dennis, was a single wooden shed; and the airfield was a 500 yd. by 300 yd pasture lent by a member of the Toronto Flying Club. Logically, despite the present size of Downsview Airport, D.H. Canada make two of the very few contemporary commercial aircraft, the Beaver and the Otter, which could use that original field!

The new company assembled and delivered 62 Moths in its first year and at the end of that period moved to its own airfield at Downsview, where a small factory, consisting of a single-storey office block and assembly and flight sheds, was erected. From then on it was a story of steady expansion and the assembling of such famous types as the D.H.61, Puss Moth, Fox Moth, Dragon, Rapide and Dragonfly. About 1930 a major step was made by the first design modification, the installation of a Pratt and Whitney Wasp in the D.H.61. In 1937, 25 R.C.A.F. Tiger Moths of modified design to take skis or floats as well as wheels, and with a sliding hood, were the first airframes to be built completely by the Canadian company. The following year saw the building of 200 Tiger Moths for the R.A.F.—the first reversal of transatlantic trade and a source of great joy to the company. By 1940, Tiger production had risen to 60 a month and then the Anson 4 joined the production line, to be followed by Mosquitos, the first of which flew on September 23rd, 1942—one month after the order had been officially signed and delivered! War-time production of the Downsview plant was 1,747 Tigers, 1,032 Mosquitos and 375 Ansons.

After the war de Havillands found themselves with a moderate-sized factory of their own, an adjacent "shadow" factory, Government-financed but operated by them, a deflated military market and strong instincts for civil aviation. First, 50 Fox Moths were built, largely from Tiger parts, and as quickly sold. Meanwhile the company's then chief designer, W. Jakimiuk, late of the Polish P.Z.L. aircraft factory, tackled the problems of making a trainer and a bush-plane, the Chipmunk and the Beaver—the success of which needs no telling. It is sufficient to say that to date 153 Chipmunks and over 160 Beavers have been built and sold.

But greatest balm to the Canadian souls of the company was their success in selling the Beaver, as the L-20, to the U.S.A.F. and the U.S. Army in the face of fierce American competition. Quantities and deliveries of the L-20 are tucked well under the security cloak, but it was accidentally revealed that the original figure of 108 had been increased to 750. So good is the impression made by the L-20 that the U.S. authorities are already showing interest in the Otter.

First flight of the DHC-3, the Otter,* was on December 12th last year and it has already demonstrated its remarkable load-carrying and slow-flying capabilities. The first pre-production aeroplane is already being assembled, with the second and third close behind. Six or eight are scheduled for this year and the design has been built to allow production-breakdown tooling.

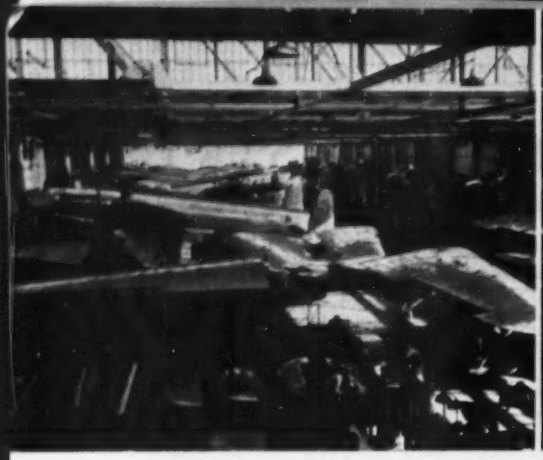
Incidentally, some idea of the potential civil market in Canada can be gained from the number of Beavers operated by the Ontario Department of Lands and Forests. It already uses 39 and has ordered two more—and this is for a single province. A walk through the hangars at the airport of any large Canadian town is instructive, for one finds Dakotas, Expeditors, Ansons, Seabees and many other types belonging to the private fleets of industrial concerns, oil companies and even department stores. The great distances make flying economical and it is this fat market at which de Havillands are aiming.

In addition to design and manufacture, the 550,000 sq ft of total floor space at Downsview is largely occupied on other work. War-time Lancaster bombers are being reconditioned and converted for maritime reconnaissance duties; Vampires are being repaired and overhauled; some Canso amphibians are still being overhauled; and, until recently, the winterization of Doves (nearly 30 in all) being delivered to Canada and the U.S.A. was also carried out there. It is mainly in the war-time, Government-financed, factory that this work is being done, and, where the contract is for the R.C.A.F., the space is loaned to the company. Where space is being used for de Havilland's civil or export orders it has to be rented from the Department of Defence Production. These arrangements, are of course, purely financial.

A general idea of the factory can be gained from the accompanying aerial view. The original factory, towards the top right-hand corner, contains the offices and technical departments and experimental, paint and some detail shops, all engaged on Otter and Beaver work. About half of the war-time factory (along the top of the picture) is also occupied on Beaver assembly and the making of the welded steel undercarriage legs, doors, cowlings, tanks and other components. The wings and fuselages of the Beaver are sub-contracted to Fleet Manufacturing, Ltd., at Fort Erie, the control surfaces and tail unit to Sanderson Aircraft, Ltd., at Malton and some detail parts to Air Vent Sheet Metal Inc. of Montreal. Referring again to the photograph, the isolated building midway between the two main blocks is the D.H. flight shed, while the

* *An article on the Otter appeared in "Flight" of April 11th last.*

All except the foreground buildings in this view of one corner of Downsview Airport, Toronto, are parts of the de Havilland works; details are given in the article. The D.H. engine factory, and the new G.E.C. gas-turbine plant, are just out of the top edge of the picture.



(Left) *Overhaul and conversion of Lancasters at Downsview for R.C.A.F. reconnaissance.* (Right) *Final assembly line of Beavers and L-20As.*

CANADA'S AIRCRAFT INDUSTRY . . .

blocks in the foreground house R.C.A.F. aircraft and the Toronto University supersonic laboratory.

The rest of the war-time factory, a fully equipped production plant, would be available to increase Beaver output or build any modern type, should it be released from its present overhaul commitments. The potential of Downsview can be assessed from its Mosquito output between September 1942 and August 1945, already quoted. The airfield, originally the property of de Havillands, is now held jointly with the Government and it is fully suitable for modern aircraft. At present, the three main runways measure 5,700, 5,000 and 4,000ft, but the north-south one is shortly to be extended to 8,000ft to cater for jet fighters.

There is yet one further aspect of the de Havilland scene to mention, and that is the engine plant. This is quite small, having originally been established for the overhaul of Gipsy engines. Its activities and space are now divided between piston-engine and jet overhaul. The facilities are far from being stretched to capacity by the number of Goblin overhauls required by the R.C.A.F.'s Vampires—work which is bound to tail off in the next two or three years as the aircraft go out of service. When this happens there will be a small factory, fully equipped to deal with every form of repair and test, and available for the servicing of gas turbines—a facility that may well be of use to B.C.P.A. and other Comet operators in the Western hemisphere.

Finally, there are the personalities at Downsview. Aiding P. C. Garratt are, on the design side of the company, Doug Hunter (chief engineer) and Dick Hiscocks (designer); production manager is Bill Burlison; sales are in the hands of C. H. Dickens, sales director and Sandy MacDonald, sales manager; R. Bannock is director and operations manager and George Mickleborough is secretary. George Neal and Doug Given are chief test pilot and senior production test-pilot respectively.

In concluding this series of articles it may be said that the Canadian Aircraft industry scene, studied in retrospect, presents a healthy picture of a youthful, promising industry. Of the three major companies there is de Havilland, small, virile and self-sufficient; Canadair, reflecting the mass efficiency of the U.S.A.; and Avro, showing all the earmarks of a leader in the gas-turbine field. Behind these first-rank companies are the smaller operators, the accessory makers, aircraft repairers and other specialists. Finally, there is a huge third rank of general industrial and engineering firms that are being roped in to meet the present emergency.

That is the picture today; while re-armament is to the fore Canada is determined to play an important part in it, and is daily showing that she can take on larger commitments. Should the need for vast air forces decline, then the industry contracting within itself should still find a ready market within the Dominion, capable of supporting a reasonably stable industry. The life of the country is expanding, the population is growing to meet the needs of industrial development, and from this will come, automatically, a domestic-aircraft market that will eventually rival that of the U.S.A.

FLYING WEASEL

A DESIGN-STUDY of what would appear to be a most useful vehicle has been formulated by Mr. E. W. Bruce Hill, who is a director of Antarctic Aviation (Int.); the preliminary specification has been completed and the company hope to build a prototype in Canada shortly.

Designated B.H.I/50, the concept has been born out of logical development of the amphibious tracked vehicle which, known as the Weasel, has accompanied nearly every polar expedition of recent years. The "Flying Weasel" is likewise an amphibious tracked vehicle with the addition of a detachable powered airframe.

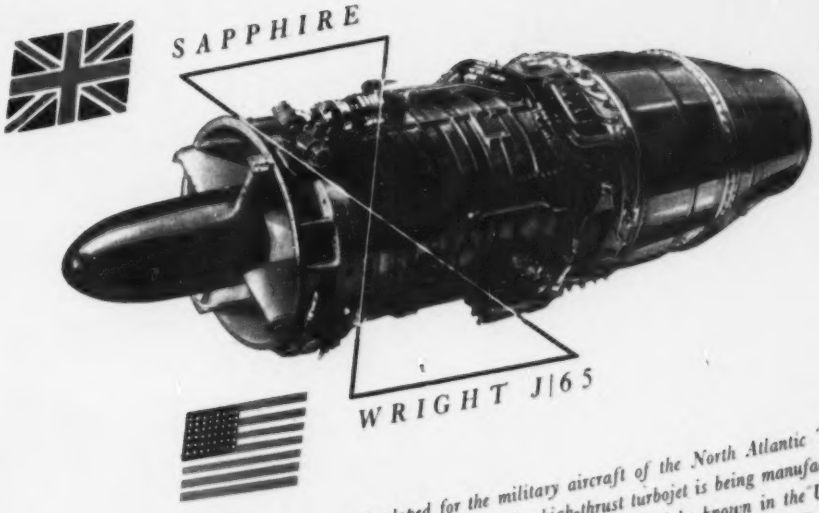
This Flying Weasel model shows the tracked undercarriage to advantage; folding wings and a rear loading door are also fitted.

The tracked hull houses a pilot centrally in the nose and four passengers, three of whom are seated on the starboard side to leave room on the port side for a 25.5 h.p. hull power plant, fuel for which is tanked under the reinforced floor. The tracked undercarriage is of very light construction to permit ready acceleration and braking; differential braking is provided for steering, the whole assembly being intended to permit operations from almost any type of surface. With the airframe attached, alighting on the water is not foreseen as a normal operation; if ditching is necessary, the "ground vehicle" is quickly divorceable from the airframe and can be used as a means of escape—in fact, the ground vehicle is to have a range of some 400 miles and should be a useful means of transport on its own.

Power for the airframe is provided by two Blackburn Cirrus Bombardier 702s driving large-diameter airscrews geared to run at 1,200 r.p.m.; other calculated data are as follow: Span, 48ft; gross weight, 5,898 lb; payload for maximum range, 918 lb; sea-level cruising speed, 115 m.p.h.; stalling speed, 47 m.p.h.; take-off to 50ft, 298yd; range, 400 miles. The amphibious tracked vehicle alone weighs 2,050 lb tare and can be loaded to 5,050 lb—although it cannot be flown at this weight; track loading is not expected to rise above 1.3 lb sq in, and a speed of 40 m.p.h. on land or 6.5 kts on water is specified.

Antarctic Aviation have offices in Luton, Beds, and Toronto, Canada; to date a mock-up of the project has been completed and is shown in the accompanying photograph. Other activities of the company lie in the field of air charter, particularly for survey

TWO NAMES . . . ONE ENGINE !

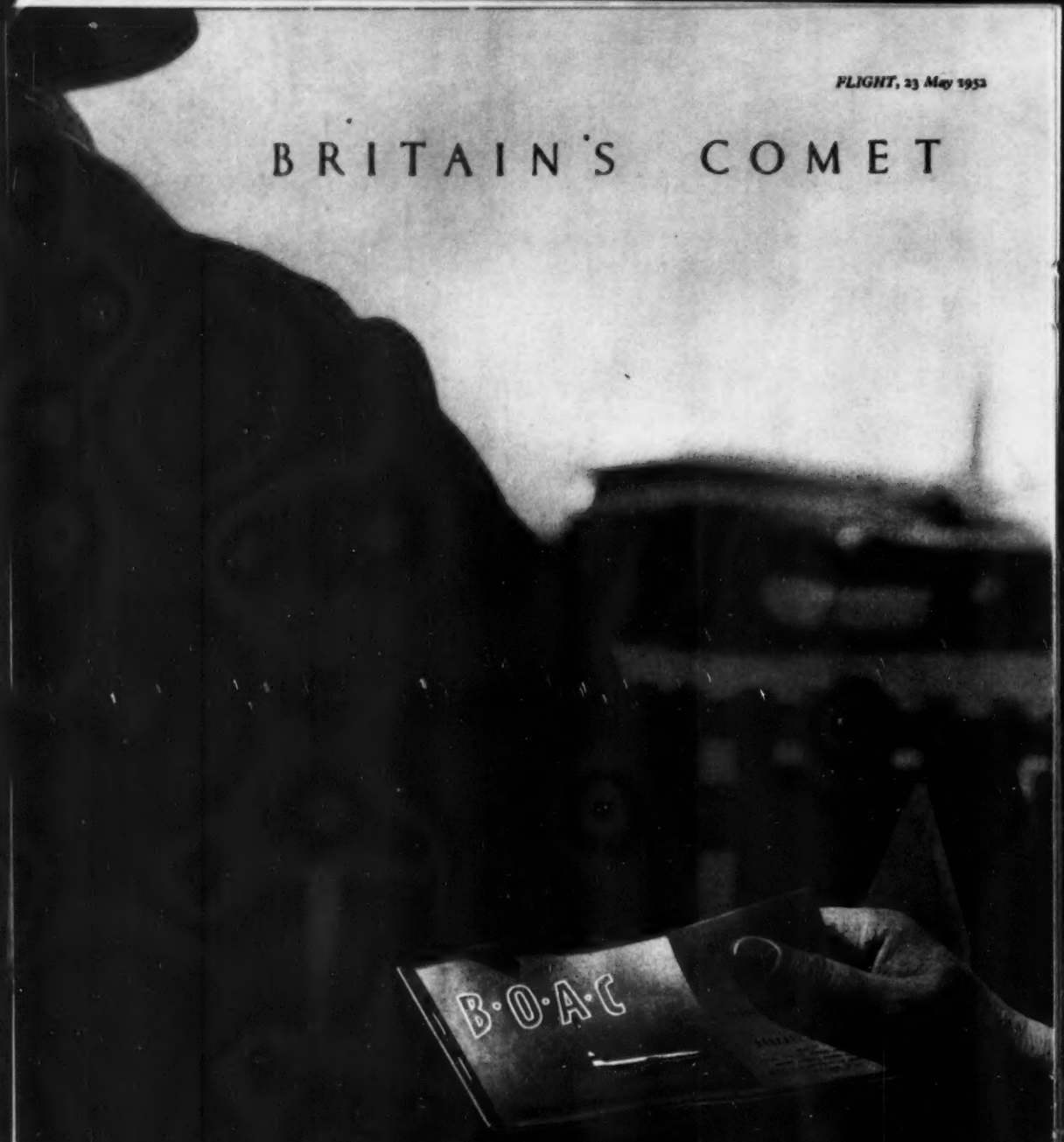


A standard power unit developed for the military aircraft of the North Atlantic Treaty Organisation, the Armstrong Siddeley Sapphire high-thrust turbojet is being manufactured under licence by the Wright Aeronautical Corporation and will be known in the United States of America as the Wright J|65 — a major contribution to Western Defence.

ARMSTRONG SIDDELEY

ARMSTRONG SIDDELEY MOTORS LIMITED
PARKSIDE, COVENTRY
Members of the Hawker Siddeley Group

BRITAIN'S COMET



The passport to a new era in global travel

DE HAVILLAND

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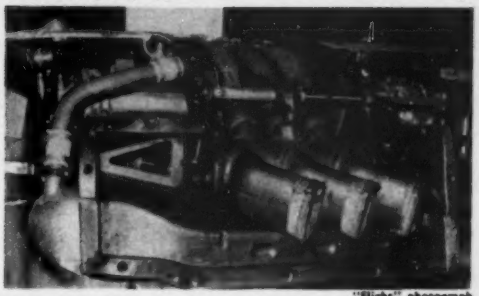
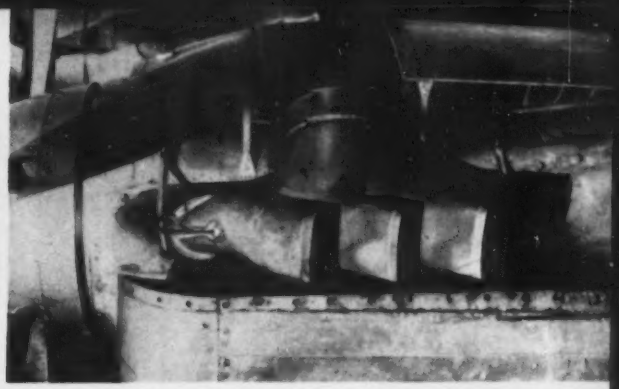




"Flight" photograph

These photographs afford an interesting comparison between the British and Canadian systems. The Rolls-Royce pattern for the B.O.A.C. Argonaut (left) is suspended from a sub-frame attached to the main engine bulkhead. The T.C.A. system (right) is carried directly by the engine and is housed between the two skins of the double cowling.

T.C.A. CROSSES OVER

Canada's approach to the problem of quietening Airliner Merlins

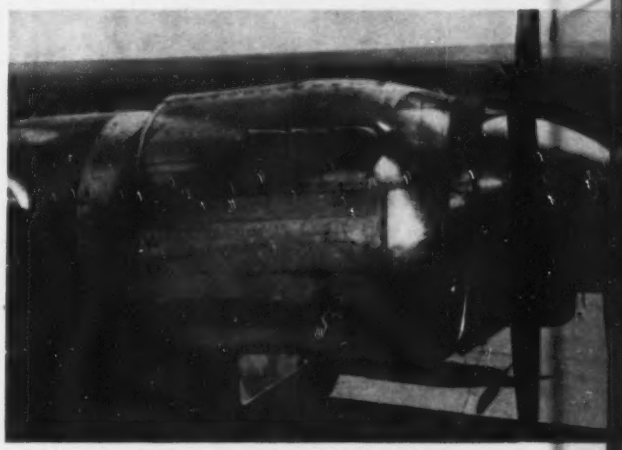
THE "cross-over" exhaust system developed by Rolls-Royce, Ltd., for the B.O.A.C. Argonauts is now well known. This installation—which was fully described in *Flight* of February 29th last—not only affords a great reduction in the noise-level in the interior of the aircraft, but also results in an increase in engine output and a decrease in power-plant drag, reflected in significantly increased range and cruising speed.

Now announced is a different approach to the problem, undertaken in Canada. For installation in their North Star aircraft—of the same basic type as the Argonauts—Trans-Canada Air Lines have developed a cross-over exhaust system which looks very much like the Rolls-Royce layout at first glance. Closer inspection, however, reveals that the T.C.A. arrangement involves an outer and an inner cowling over the top of the power plant, separated by longitudinal webs to which both the skins are riveted. The cross-over pipes are cooled by an airflow between the cowling layers, the intake and outlet for which are apparent in the third of the accompanying photographs. It will be remembered that the Rolls-Royce system takes cooling air from the lower lip of the main radiator intake.

The inner cowling shields the engine from the exhaust system, the primary exhaust stubs being passed up through this skin to meet the cross-overs. At the junction between the primary stubs and the cross-overs there is no cylindrical box as in the British pattern; the joint is a smooth weld between flared tubes in each case.

The published details of the T.C.A. system suggest that it shows up badly in comparison with that used by B.O.A.C. Some comparative figures (T.C.A. system first) are : increase in power-plant weight, 73 lb against 38 lb; noise reduction (mean), 6 db against 5 to 8 db; change of cruising speed, loss of 1 m.p.h. against gain of 6 m.p.h. The Canadian system would also appear to render the engine somewhat less accessible, although T.C.A. claim that the elapsed time necessary for a plug-change is not greatly increased.

The T.C.A. layout has been largely developed by Mr. "Mac" Macleod, the airline's supervisor of job methods and development. Canadair, Ltd. (makers of the aircraft) have signed a contract to supply T.C.A. with production assemblies of the new system for all twenty North Stars; the fleet will be entirely equipped by September of this year.



A pre-production T.C.A. cowling on a Canadair North Star

B.O.A.C. are taking longer to equip the Argonauts in like manner, but this is due to the fact that the change is made only when an aircraft is in for major overhaul; to equip the twenty North Stars in four months would appear to require some loss in fleet utilisation.

FORTHCOMING EVENTS

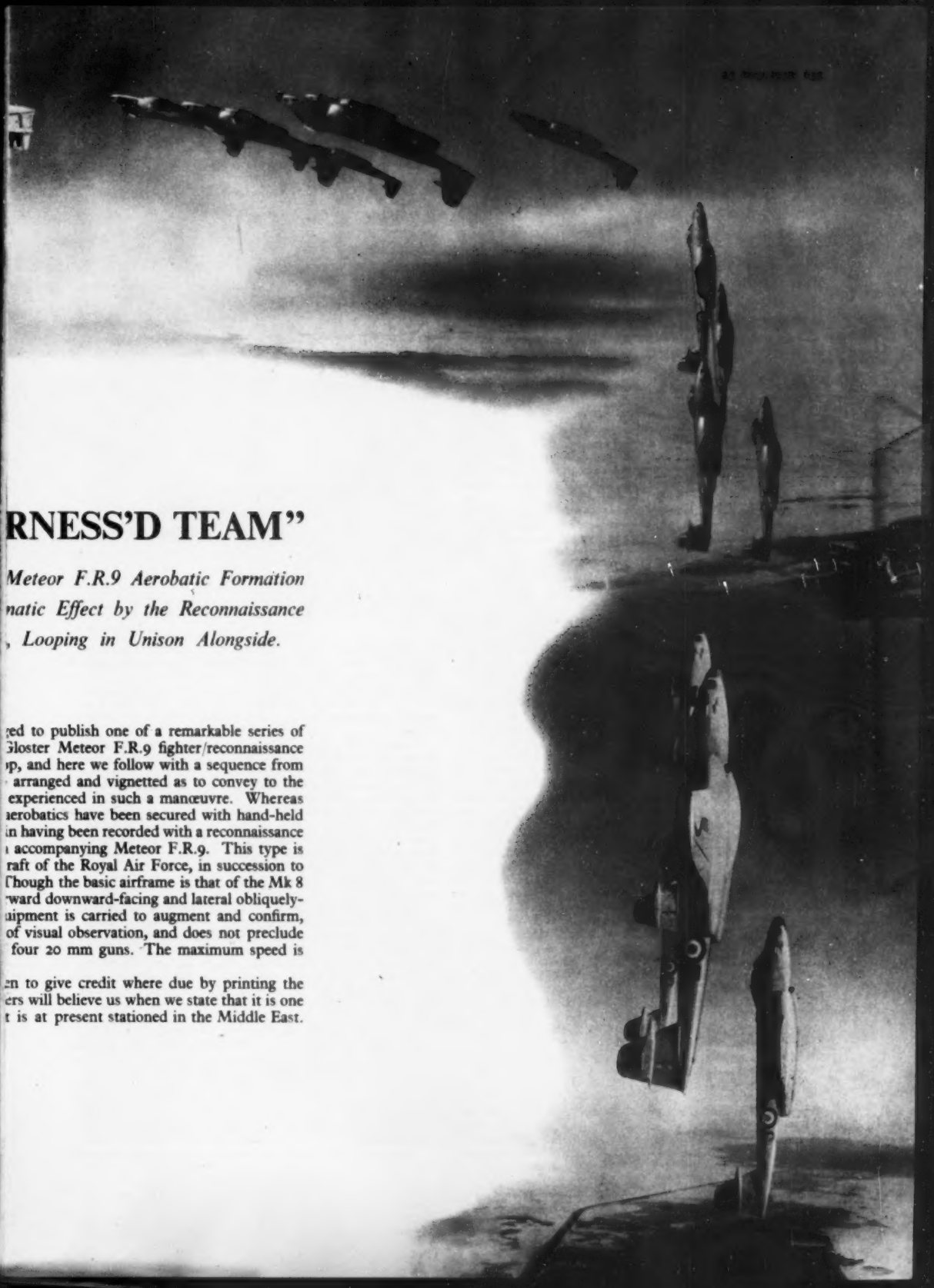
May 23. Aircraft Golfing Society: Annual Dinner.
May 25. Aéro-Club de Pisa: Rally.
May 25. Aéro-Club de France: Foire de Paris Rally.
May 25. Ragosine-Auster Trophy Navigation Competition, Rearsby.
May 29. R.Ae.S.: Fortieth Wilbur Wright Memorial Lecture: "Prophecy and Achievement in Aeronautics," by Sir Harry M. Garner, C.B., M.A., F.R.Ae.S.
May 31-June 2. Aéro-Club de Cannes: International Rally.
May 31-June 2. Ailes Sparnaciennes: Champagne Rally.
May 31-June 3. Aéro Club de Roma: Rally.
June 2. S.S.A.F.A.: Air Display, Yeadon, Leeds.
June 2. Midland Aero Club: Display, Elmdon.
June 4-14. Third Mechanical Handling Exhibition, Olympia, London.
June 6-8. Aéro Club d'Italia: Air Circuit of Sicily.
June 7. A.T.A. Association: Flag Dedication, and Reunion, White Waltham.
June 7-8. Yorkshire Aeroplane Club: International Invitation Rally.
June 8. Royal Naval Flying Club: At Home, R.N. Air Station, Gosport.
June 8. R.A.F. Golfing Society: Match v Air Ministry G.S.
June 14. Girl Guides Association: Air Ranger Flying Pageant, Sywell, Northampton.
June 14. Auster Flying Club: Rally, Rearsby.
June 14. R.A.F.A.: Air Pageant, Sydenham, Belfast.
June 14. London Aeroplane Club, Vintage Aeroplane Club and Herts Auto and Aero Club: At Home, Panshanger.
June 14. Fair Oaks Flying Club, R.A.F.V.R., and London Transport Flying Club: At Home and Display, Fair Oaks.
June 14-15. Aéro-Club de Charente Maritime: Pons Rally.
June 15. R.Ae.S. Garden Party, White Waltham.
June 18. Aircraft Recognition Society: Contest, London

"HEAVENLY-HA

The Disciplined Manœuvring of a
is Recorded with Unsurpassed Dra
Camera of a Similar Machine

IN the issue of May 9th we were privileg
photographs depicting a formation of
single-seaters completing a formation loo
the same series. The pictures have been so
viewer a sense of the sustained exhilaration
previous photographic studies of formation
cameras, the present series is perhaps unique
camera obliquely mounted in the nose of a
now the standard fighter/reconnaissance airc
various marks of the Supermarine Spitfire.
intercepter, it differs in that the nose has fo
facing camera ports. This photographic eq
rather than to supersede, the pilot's powers
the installation of the standard armament o
585 m.p.h. at sea level.

It is our only regret that we are forbidd
number of the squadron concerned; but reac
of the most famous units in the R.A.F. I

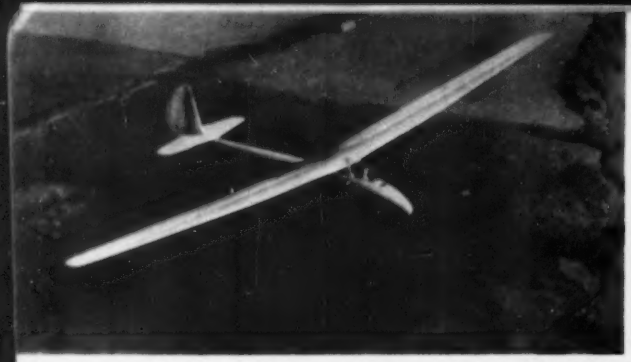


RNESS'D TEAM"

Meteor F.R.9 Aerobatic Formation
natic Effect by the Reconnaissance
, Looping in Unison Alongside.

ged to publish one of a remarkable series of Gloster Meteor F.R.9 fighter/reconnaissance op, and here we follow with a sequence from arranged and vignetted as to convey to the experienced in such a manœuvre. Whereas aerobatics have been secured with hand-held in having been recorded with a reconnaissance accompanying Meteor F.R.9. This type is raft of the Royal Air Force, in succession to Though the basic airframe is that of the Mk 8 ward downward-facing and lateral obliquely- uipment is carried to augment and confirm, of visual observation, and does not preclude four 20 mm guns. The maximum speed is

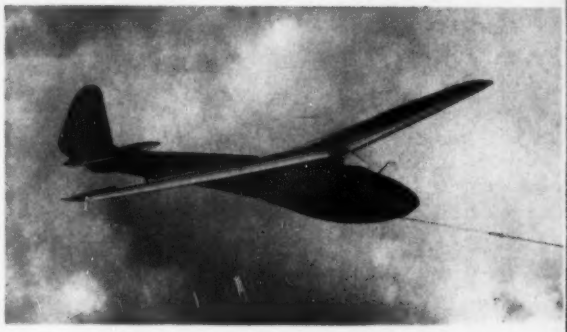
en to give credit where due by printing the ers will believe us when we state that it is one t is at present stationed in the Middle East.



Three types of sailplane among those currently in use by the R.A.F.G.S.A. are the Slingsby Sky (left), Gull IV (right) and, below, Eon Olympia

SERVICE GLIDING

The Birth and Development of the Royal Air Force Gliding and Soaring Association



THE Royal Air Force Gliding and Soaring Association has just completed an extensive reorganization, so that this is an appropriate time to describe both its growth and its new constitution.

Before the war there was already in the Royal Air Force a growing interest in gliding, which showed itself mainly in the enthusiastic membership of individual members of the Service in established civilian gliding clubs. G/C. (then F/L.) Mungo Buxton will be remembered as the holder in 1932 of the first national distance record, and in 1934 of the national height record, with a gain of 8,323ft; subsequently he designed the Hjordis, which, built by Slingsby Sailplanes, was the forerunner of the King Kites flown by the first British team to take part in an international soaring contest; this took place in Germany in 1938, and another early enthusiast (and C.F.S. instructor), F/L. P. McG. Watt, was a member of that team. It is interesting to recollect that the Sky sailplanes to be flown by this year's British team in the International Championships in Spain is the latest of the line of Slingsby-built high-performance sailplanes that began with Buxton's Hjordis; and that the Royal Air Force is again represented in the team, this time by F/L. R. C. Forbes, who, in 1951, became the British national soaring champion.

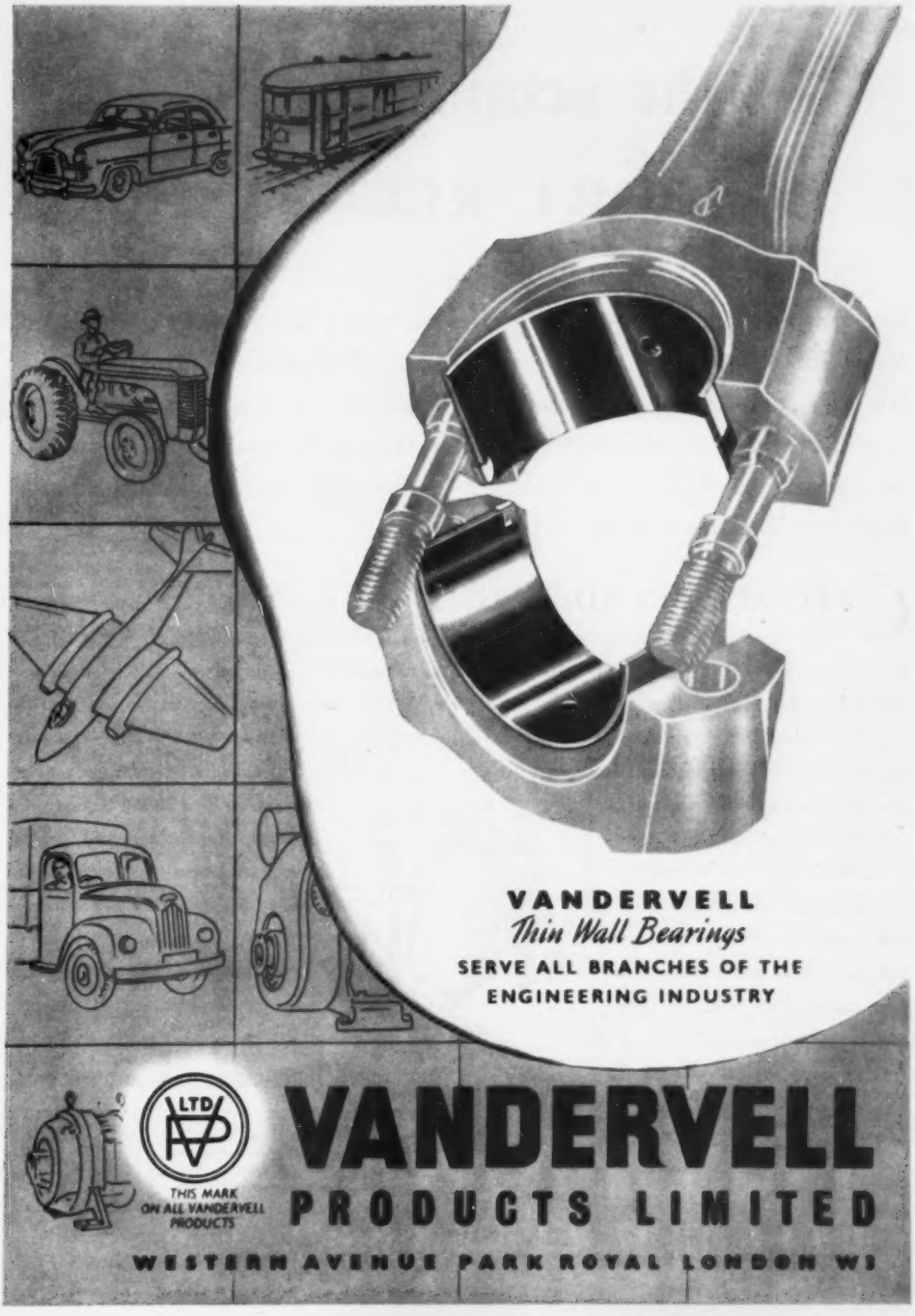
In 1939, the war brought all gliding in England to a standstill, so that, until the creation of the Airborne Forces, and the growth of gliding in the Air Training Corps, motorless flight remained the monopoly of the enemy. Thus it was that, with the collapse of Germany in 1945, the Royal Air Force found itself with three elements interested in gliding: those with A.T.C. experience; those connected with the Airborne Forces; and, thirdly, 2nd T.A.F., who found themselves in somewhat surprised possession of the finest fleet of high-performance sailplanes remaining anywhere in the world. Since that time, many thousands of R.A.F. personnel have flown with the gliding clubs in B.A.F.O. (now once again 2nd T.A.F.), and this, more than anything else, has stimulated the demand for similar facilities in the United Kingdom. It was the direct result of this demand that led, in the autumn of 1949, to the formation of the R.A.F.G.S.A.

At this point it is perhaps necessary to make clear that R.A.F. gliding in the United Kingdom takes place under a number of distinct organizations, having widely varying functions. First, there is the Air Training Corps, concerned with the pre-service training of cadets, and using (in common with the other Reserves and Auxiliaries) equipment provided by the Service and paid for at the public expense. Next, there are the gliding flights at Cranwell and Halton, the equipment for which is also provided by the Service. There is also the Empire Test Pilots' School, which operates two Olympias provided by the Ministry of Supply, and which includes sailplane flying as part of its training syllabus; the record-breaking flights by F/L. Bedford will be remembered as having been made in 1951 on one of these aircraft, and these still stand as the British height, distance, and goal-flight records. Finally, there is the R.A.F.G.S.A., now comprising seven constituent clubs, which, with membership open to all ranks of the R.A.F. and W.R.A.F., covers all strictly amateur gliding by the Royal Air Force in the United Kingdom.

In sharp distinction to all the other gliding activities so far listed, the R.A.F.G.S.A. is financed exclusively out of the pockets of those taking part, aided by limited grants from certain non-public sports funds. The Association receives no aid of any kind from public funds; there is, therefore, a constant struggle to keep charges within the limited means of members, and the degree of success achieved is in direct proportion to the personal efforts of members towards the running of the Association. As every task connected with the R.A.F.G.S.A. is undertaken by members in their spare time, and is additional to normal duties, there is never much time in hand.

The R.A.F.G.S.A. defines its aim as "To bring gliding and soaring within reach of all members of the Royal Air Force, with special regard to those normally employed on the ground." This is a pretty large proposition, and must be viewed in proper perspective. It is the opinion of the committee, and a view supported by the progress so far achieved, that it will take about ten years to achieve this aim; and progress must be measured in terms of organization and efficiency as well as in actual numbers of aircraft. When the R.A.F.G.S.A. bought its first two aircraft—a Prefect and a Sedbergh—in March, 1950, this was its whole fleet, and it was stationed at Detling, under the control of F/L. Forbes then O.C. the Home Command Gliding Instructors' School. Very soon, however, it became evident that two aircraft based in Kent were quite inadequate to meet the widespread demands being made, and after a few months it became possible to undertake the first reorganization and accompanying expansion.

This process involved the creation of new clubs, operated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the economics of AIRPORT RECORDING

From the standards and recommended practices laid down by the Convention on International Aviation, it is evident that automatic recording for Air Traffic Control will sooner or later be expected at every airport. The problem of high costs has hitherto caused natural hesitation on the part of some airport authorities in implementing these requirements. In this series of advertisements, the answer to this problem is dealt with under the three headings of Capital Expenditure, Staff Requirements, Operating Costs.

CAPITAL EXPENDITURE

What are the considerations in reducing the hitherto high initial cost of Airport Recording equipment? They are three-fold. First, it is essential that the equipment should incorporate multi-channel recording. Second, the recording medium must be of a non-expendable material. Third, simplicity in design and a high degree of standardisation. The Thermionic Multi-Channel Airport Recorder developed by the T.P. Group has been designed to meet precisely these requirements. Thus, whilst completely fulfilling every requirement of Air Traffic Control, it reduces the cost of airport recording to the lowest yet achieved. It will monitor any number of channels up to a total of 14 on one magnetic recording tape — and for a period of up to 12 hours — without attention. The tape, which is virtually unbreakable can be used over and over again. The equipment is built up from a number of interchangeable units to suit the needs of airports or air traffic control centres of any size.

Recordings can be played back any number of times without loss of quality. When no longer required they can be immediately erased on a separate demagnetiser unit — separate to ensure security. The tape is then ready for immediate re-use without further processing.

Full details of this latest development in low-cost airport recording equipment will be supplied gladly on request.

Thermionic multi-channel airport recorder

Other products include the Soundmirror magnetic tape recorder, the Recordon Magnetic Dictating Machine and a complete range of instruments for electro-acoustical measurements.

A PRODUCT OF THE TP GROUP OF COMPANIES

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Another type used by the R.A.F.G.S.A. is—in addition to the T.31 two-seater trainer—the Sedbergh two-seater trainer. In the picture on the right is the Association's Weihe, which was taken to France last year to explore the St. Auban standing wave. With it are S/L. A. R. Williams and G/C. G. J. Paul, D.F.C., chairman of the Association. An article on the St. Auban trip appeared in "Flight" of November 9th, 1951.

SERVICE GLIDING . . .

by Bomber, Coastal and Technical Training Commands, and by 90 Group, the incorporation into the Association of the old 12 Group Gliding Club, first formed at Middleton St. George in 1945; and the creation of the "Moonrakers Gliding Club" in the West of England; this latter is of special interest, having been formed by the banding together of the resources of a number of units in the area, and thus forming the prototype of the club on which the second and latest reorganization has been based.

The first reorganization was followed by a period of growth and consolidation, during which the total numbers of aircraft available increased, from the original two, to 25 by the end of 1951; these included many Cadets, a Weihe, a Gull II, a Gull IV, an Olympia, three Sedberghs and four T.31s, two of these being under construction from kits of parts.

By the middle of 1950 it had become evident that the existing organization (at that time based upon Commands), while having the advantage of following the normal chain of R.A.F. Command and responsibility, failed to make best use of the increased facilities becoming available. The R.A.F. Command system at home is, of course, designed on a functional basis, with the geographical areas of interest of each Command overlapping; thus, to apportion R.A.F.G.S.A. resources by Commands was uneconomical. The decision was therefore made to organize the constituent clubs upon a purely geographical basis, locating them in such a way as to secure the most even distribution of facilities amongst the R.A.F. population of the country, and at the same time making membership of each club open to all members of the R.A.F. and W.R.A.F. of whatever Command or unit within the area.

As a result of this decision, there are now seven clubs, together comprising the R.A.F.G.S.A. and one associate club. The seven clubs are located respectively at Balado in Scotland; Middleton Saint George, County Durham; Bridgnorth, Shropshire; Scampton, Lincs; Watton in Norfolk; Boscome Down, Wilts; and Compton Bassett, Wilts; the associate club is that at the R.A.E., Farnborough, this status having been adopted on account of the special conditions prevailing there, which make it impossible for the club to comply with the conditions of full membership of the R.A.F.G.S.A. by being open to all comers from other units. Within the limits prescribed by the Association's standing orders, each club is fully responsible for, and independent in, the conduct of its own affairs, and elects its own officials and committees.

Locations of stations in England and Scotland at which member-clubs of the R.A.F.G.S.A. are at present operating. The stations are underlined.

The aim in equipping each club has been to provide it with a minimum establishment of one good sailplane, two elementary single-seater gliders, and one two-seater equipped for dual instruction. At present the R.A.F.G.S.A. fleet consists of the following aircraft:—

Sailplanes.—Weihe, Gull II (two-seater awaiting C. of A.), Gull IV, Eon Olympia, Gull I.

Two-seaters (Dual).—Five Slingsby T.31s (two under construction from kits of parts), two Slingsby Sedberghs, one Falcon II.

Medium and Elementary Single-Seaters.—Ten Slingsby Cadets, one Kirby Kite, one Slingsby Tutor, one Slingsby Prefect, one Eon Baby.

This makes a total of 27 aircraft. Of these, the Weihe and the Gull II are in rather a special category, and are unsuitable for use as standard club sailplanes in the Association's present state of development; the Weihe is at present under overhaul, on completion of which it will be located at Turnhouse, under the direct control of F/L. Forbes, where it is hoped that he, and other suitably qualified members of the Association, will be able to explore the interesting standing waves which are frequently reported to occur in that area. A decision upon the future of the Gull II awaits its receipt of a certificate of airworthiness and subsequent return from its makers, in whose hands it now is. It will thus be seen that, in order to complete the new organisation, the Association requires five new sailplanes, and their purchase is the next immediate objective of the R.A.F.G.S.A. committee.

The present position has not been achieved without exertion, and it is worth remarking upon that, since every gain has been the outcome of members' personal efforts in their spare time, there are no "passengers" in the organisation; those who belong are driven by an insatiable enthusiasm. Members look forward now to a period of consolidation by the seven existing clubs, during which each must grow in vigour and size, until it, in turn, reaches the point where it can expand again, in the same way as did the initial foundation at Detling.

The final aim, when achieved, should see the Association so organized and so equipped as to be able to offer to any airman of any trade, provided he is possessed of initiative and determination, a fair opportunity to qualify as an R.A.F.G.S.A. pilot. Those interested now should refer to Air Ministry Order N.245/52.

G. J. C. P.

ASLIB'S PROGRESS

SOME indication of the wide scope of work now being conducted by the information and documentation service known as Aslib is contained in the annual report, recently issued. Of its "special groups," and of that covering the aeronautical field in particular, the organization has this to say:—

"A start was made early in 1951 towards forming the first of a number of special groups, each representing a particular interest. The Aeronautical Group was formed not on Aslib's initiative but at the instigation of members of the aeronautical industry, and it says much for the group's vigour that it has already secured substantial recognition outside Aslib. About 100 representatives of the industry attended its inaugural meeting at the R.A.E., Farnborough. The Royal Aeronautical Society generously gave up one of its main winter meetings to a joint meeting with the group on 'The availability and use of aeronautical information,' and valuable relations were established with foreign organizations . . .

"The Aeronautical Group has set up working parties to consider abstracting, the indexing of aerodynamic data and the compilation of a union list of periodicals."

The headquarters of Aslib are at 4 Palace Gate, London W.8.

SEEN at the B.I.F.

Some Thoughts on Meeting Old Friends in New Surroundings: Developments in Research and Production

THESE notes on the 1952 British Industries Fair—held in London and Birmingham, it concluded last week—do not purport to form a complete report; rather are they informal remarks on odd points of mild, medium or strong interest to the aeronautical industry, jotted down by a member of the staff during a tour round the hundreds of stands at Castle Bromwich, Olympia and Earls Court.

IF we may be forgiven for starting on what might be termed a defeatist note, the trouble about the British Industries Fair, in this or any other year, is that there's so much of it. At Birmingham, the vast block of hangar-like buildings alongside Castle Bromwich airfield last week housed the stands of 1,300 engineering exhibitors in its half-million square feet; and in London the lighter industries shared Olympia (300,000 sq ft) and Earls Court—at 260,000 sq ft, "the largest unobstructed indoor arena in the world." All of which, for your scribe in search of needles of aeronautical interest in this industrial haystack, spelt plenty of healthy exercise.

Over and above this (at Castle Bromwich, at any rate) he was constantly finding himself halted, surprised and enraptured, before mighty pieces of heavy machinery bearing names honoured in the aircraft industry. For instance, though he knew of their fame in the world of heavier electrical engineering, he had got into the way of coupling the initials B.T.H. only with neat little aircraft generators and actuators; so he was suitably awed by finding the British Thomson-Houston stand disposed, as it were, about the feet of a 62,400 kVA vertical water-wheel alternator. English Electric, too, produced rather the same effect with a "typical diesel power-house layout, comprising a 4RK Mark II diesel engine with alternator, exciter and switchgear"; Canberras, Mark II or any other, seemed very far away. Even Rolls-Royce, exhibiting on the collective stand of Derby's industries, were represented not by an Avon, but by a 190-b.h.p. supercharged industrial oil engine—which, incidentally, in the perfection of its detail finish, looked anything but "industrial."

Quite obviously, these and many other great names in the aircraft industry were saving up their purely aeronautical exhibits for the purely aeronautical show—the Farnborough fiesta—and one understands, indeed, that the S.B.A.C. discourages them from displaying these *chefs d'œuvre* anywhere else.

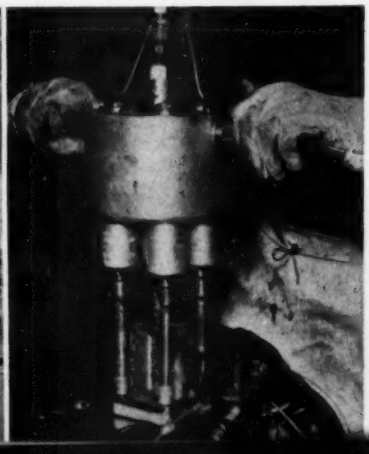
Undaunted, however, we followed our nose for news into the back entrance of a stand festooned entirely with saucepans, where

Almost the only purely aeronautical note was struck by the combined stands of the Corporations at Olympia (shown here) and Castle Bromwich. Big Viscount and Comet models "flew" overhead; and on the stand were part-sectioned models of each of several classes of B.E.A. and B.O.A.C. aircraft, to illustrate cabin arrangements.

in no time at all we found ourselves talking Avons with N. C. Joseph, Ltd. (of, appropriately, Stratford-on-Avon), who made tens of thousands of pressings for the aircraft industry during the war, and who are now doing so again, for Rolls-Royce among others. If people are experts in pressing "domestic holloware," it seems, turbojet components are child's play. So it was, also, with another Stratford-on-Avon firm, Precision Metal Spinnings, Ltd., on whose stand radar reflectors arose from a pyramid of kitchen utensils; this firm has lately been doing spun components for, among other aircraft, the Percival Prince and Provost and Westland S-51, S-55 and Wyvern.

It would not have been surprising to find that a firm with the name of Clang, Ltd., of London, N.W.2, was also among the saucepans; but their stand was in the adjacent electrical section, and among a plethora of domestic electricalities we discovered a few little bits and pieces that looked aeronautical; indeed they were, said Messrs. Clang—and handed us a list of very nearly 1,500 separate items, all A.I.D. and A.R.B.-approved. . . We likewise found a few examples of aircraft electrical equipment on the stand of Aerialite, Ltd. (Stalybridge, Cheshire), who are mainly wiring specialists with a wide range of aircraft-approved cables. British Insulated Callender's Cables, Ltd., were principally showing the weighty sort of stuff one sees being dragged into holes in pavements, but a few samples of their well-known "Pren" aircraft cables could be discerned.

Still in the electrical section, we were next attracted by the



(Left) The visitor familiar with only the specialized types of product exhibited by particular firms at the Farnborough Show was constantly surprised at the wide fields which such concerns covered, as exemplified at the B.I.F.: for example, an aircraft battery was only one among dozens of different types represented on the Exide stand. (Right) A new Desoutter tool, demonstrated at Castle Bromwich, was the SR.50 quadruple pneumatic motor, designed for tightening four nuts simultaneously.

vibrant words "I am receiving you loud and clear, five by five." They were emerging from a loudspeaker on the stand of Standard Telephones and Cables, Ltd., who had one of the most ingenious exhibits in the whole show—their HTR.10A V.H.F. single-channel mobile equipment, demonstrated in communication with a car driver touring the surrounding countryside, upon which he was giving a running commentary. And just to prove that this equipment—which mainly employs STR.12C aircraft components—is "fully tropicalized," the receiver was operating immersed in an aquarium of tropical fish! Of S.T.C. aircraft radio, incidentally, we were told that V.H.F. equipment is now being shipped direct to America for installation in Super-Constellations for Air France and Convair-Liners for K.L.M.

The G.E.C. exhibit this year was centred upon the work of the company's research laboratories. The cold pressure-welding process for aluminium, first made public in 1946, seems to have progressed a long way, and other developments demonstrated on the stand included two kinds of apparatus used for measuring, respectively, (*a*) vibration frequencies and (*b*) shaft displacement and eccentricity, in steam turbines; and they might well have gas-turbine applications. We were also introduced—by a most knowledgeable young lady—to a Spherical Integrating Photometer, but we decided to take that one as read.

Electroplant, Ltd., of Wembley, were showing an aircraft structural member (loaned by Bristols) under vibration test applied by their ultra-low-frequency generator, described recently in *Flight*.

On the Chloride Batteries stand, we discovered an example of the now well-known Exide aircraft battery in its cream-coloured Polythene case, and Pritchett & Gold and E.P.S. Co., Ltd., included an aircraft battery in their display. On the Oldham stand, too, were 12- and 24-volt aircraft batteries.

Decorative and Protective

Adjacent to the electrical group at Castle Bromwich was the building section, in which were to be found the paint firms, including several familiar names. Cellon, Ltd., for instance, were showing finishes for home, industry and transport (the last including air transport, in which their new 1-4-2 one-solution pre-treatment primer was featured). Lewis Berger (Great Britain), Ltd., were displaying no aircraft finishes, but reminded us that their products are used by Austers. Jenson and Nicholson, Ltd., were displaying their Liquid Envelope—"the original strippable coating, evolved in America during World War II to package complete planes being shipped overseas as deck cargo"; they are the sole British licensees.

Most of the firms specializing in rubber moulding and bonding showed, or at any rate advertised, aircraft components. George Angus, British Tyre and Rubber, P. B. Cow, Dunlop, Goodyear, Hall and Hall, Hertfordshire Rubber, Ioco, David Moseley, Sorbo, and Wilkinson Rubber Linatex were among them.

Plastics, for some reason, were one of the few types of exhibit common to both the Birmingham and London sections of the Fair. To attempt to review this now vast field in these notes would be a sheer impossibility,* but among the firms at Castle Bromwich which we noticed to be making specific mention of aircraft were I.C.I. Plastics (featuring Perspex), Tufnol, Ltd., United Ebonite and Lorival, Ltd. (Little Lever, nr. Bolton, Lancs), and Bakelite, Ltd. The last-named firm displayed, *inter alia*, Wareite, now much used for table-tops and other cabin-interior work, and on which decorative designs can actually be produced by a photographic process. Further brief mention of plastics is made in the London section at the end of these notes.

And now to the main engineering section, where our jottings must perforce become more disjointed, so great was the variety. Once again, this time on the stand of Thompson Brothers (Bilston), Ltd., we were to be surprised at the scope of a firm which hitherto we had associated with one particular line—in this case aircraft refuelling tankers. If you build tankers, it seems, you automatically know a great deal about heavy-sheet-metal fabrication; so it was not surprising to find here vast stainless-steel vessels for evaporating milk. But the Bilston firm are equally happy with lighter stuff, and they showed a thrust diaphragm for the Armstrong Siddeley Python (with attachment centres accurate to 0.002in) plus a photograph of a Bristol Proteus mounting.

The big stand of Guest, Keen and Nettlefold concealed a most luxurious little cinema-theatre, where your correspondent gratefully relaxed with a cup of tea and watched a film explaining how and why Phillips recessed-head screws preserve surrounding surfaces from screwdriver damage; and if space permitted he could say a lot about Aerotight stiff-nuts and the dozens of other G.K.N. specialities in this line. Passing on, however, he found Firth-Vickers Stainless Steels displaying, among their other specialities, a gigantic roll of cold-rolled stainless-steel strip, 31in wide, 20 s.w.g. in thickness and 1,400ft long. Then on to Langley Alloys, of Slough, who know more than most people about copper-base and nickel-base alloys; here were "Hidurax" aluminium-bronze stampings for compressor-blades and "Hindurel" as used in Bristol cylinder-heads and valve guides. And on, also, to I.C.I. Metals Division, who were focusing attention on titanium, the fourth most plentiful of the structural metals, yet so far produced on a pilot scale only; they claim for it the advantages of both aluminium and steel, saying that, alloyed with other materials, it offers tensile strengths of up to 70 tons/sq in and maintains an outstanding ratio of strength to weight under temperatures up to 500 deg C. Another "new" metal was to be found on the Ferranti stand—NOduMAG spheroidal austenitic iron: this is a cast iron which is virtually non-magnetic and which does not share the brittle properties characteristic of grey iron.

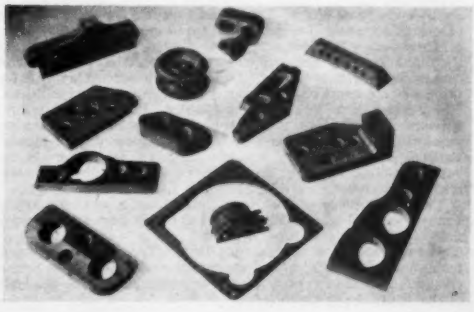
Nor must we leave the metallurgical side of the B.I.F. without mention of David Brown Foundries, on whose stand some intricate little aircraft castings nestled coyly alongside others weighing upwards of five tons. David Brown Gears were also represented, this exhibit including their Radicon worm reduction gears.

Desoutter Bros., Ltd., showed their immense range of portable tools, well known to Farnborough "static show" visitors, plus a new and even more efficient weapon just added to the armoury—the SR.50 pneumatic motor, which, weighing only 2 lb 9 oz, develops nearly ½ h.p. and uniformly runs and tightens four nuts simultaneously; it was developed for the Austin Motor Co., but should prove equally valuable in aircraft-engine assembly.

B.O. Morris, Ltd., Coventry, have long supplied their flexible-shaft tools to the aircraft industry, and they showed us examples—the Morrisflex twin-head machine, employed for simultaneous inside and outside wire-brushing of gas-turbine combustion-chambers in preparation for welding; a shoulder-slung ¼-h.p. machine used with a 6in mop for polishing aircraft skins; and another machine which, though picturesquely known as a back stand idler, is a very willing worker with an abrasive belt (its uses include turbine-blade finishing).

Wolf Electric Tools, Ltd. (London, W.5) had an impressive

Smooth and shiny, the R.A.E. all-plastic delta wing attracted much attention at Earls Court. Its construction is illustrated on page 627.



Typical D.H. Comet details—cleats, cable-supports, fairleads and pulleys—made in Bakelite Laminated by H. Comoy and Co., Ltd.

* *The reader is referred to an article on the subject, on pages 626-627.*

SEEN AT THE B.I.F. . . .

display, though the remarkable little "Cub" home constructor set seemed to be stealing a good deal of limelight from the more industrial types of equipment. F. Gilman (B.S.T.), Ltd., of Smethwick, showed, along with their flexible-drive machines, the incredible range of milling cuttings and files—nearly 100 different patterns—designed for use with them.

Herbert Terry, Ltd., had arranged a "flower garden" of springs, each painted a different colour; the Morgan Crucible Co., Ltd., showed, apart from foundry crucibles, their "Reservoil" sintered-metal oil-retaining bearings; Rosalex, Ltd. (Manchester), demonstrated their hand-protection preparations, an insurance against industrial dermatitis; Wright's Ropes, Ltd., told us that their steel ropes range from the sort employed to keep the Festival Skylon upright to those used for aircraft controls; and M.C.L. and Repetition, Ltd. (Langley, Birmingham), said that they are prepared to undertake almost any sort of work machined from the bar, though preferably on long runs.

It was pleasant to recognize a definite aircraft component—in this case an oil tank—on the stand of Essex Aero, Ltd., the Gravesend specialists in magnesium; a patented ultra-modern hospital bed provided a curious contrast. Saunders Valve Co., Ltd., had examples of their spherical-plug cocks on view, and remarked that something like 19 of them were used in the Comet. The Airscrew Co. and Jicwood, Ltd., showed a two-bladed wooden airscrew 24ft in diameter—a startling sight until one was told that it was for a cooling tower; they also exhibited Jicwood press tools, as used in the production of the Ambassador. The Hymatic Engineering Co., Ltd., did not display their aircraft compressors, concentrating instead on their industrial units and pneumatic tools. Vokes, Ltd., likewise showed no aircraft products, but suitably impressed us by indicating a "sub-micron filter for the separation of bacteria and virus"—it can sort out the little fellows down to 0.2 microns, which is 0.0000008in! Sand from desert runways should present no problems to people who can do this sort of thing.

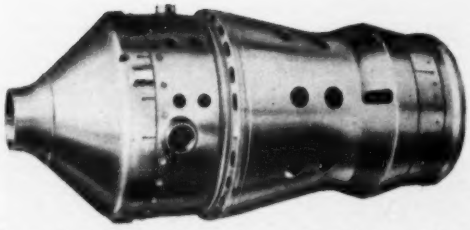
It seemed that the variety of the Castle Bromwich exhibits was unlimited. Jenolite, Ltd. (London, W.C.2), were demonstrating their range of aluminium cleaners and degreasers, aluminium keying solution and other surface-treatment compounds; Aerofilms, Ltd., had a picture-gallery of splendid colour photographs of factories, farms and estates; English Numbering Machines, Ltd. (Enfield, Middlesex), were showing counting devices for many different kinds of machinery, including an "hours recorder" for internal-combustion engines; the B.B. Chemical Co., Ltd., were extolling the merits of "Bostik"—subject of an article in these pages a fortnight ago; and the stand of Bell's Asbestos and Engineering, Ltd., was tenanted by one of those formidable-looking "asbestos men" so familiar on airfield fire-tenders (Bell's also showed lightweight plasticized asbestos fabrics and a variety of fire-sealing, jointing and other materials with aircraft applications, plus a length of 10in-diameter Hycar-treated lightweight asbestos hose as used to connect air-conditioning ground units to aircraft).

For the Design-office

On the stand of Mavitta Drafting Machines, Ltd., Miss Mavitta, the managing director, was to be found explaining the virtues of an entirely new machine—shown in prototype form—working on the endless-band principle favoured in drawing-offices across the Atlantic (it is a method that gives greater accuracy at the extreme corners of the board, and also permits greater radial traverse round the index plate).

On another stand—that of J. M. Steel and Co., Ltd. (London, W.C.2)—we were attracted by the sight of gas-turbine flame-tubes dappled in gay orange and red paint. Actually, of course, the colours were "Thermindex" paint, now widely used in research and test work for indicating local temperature-values. The components had been brushed over with the original monochrome paint and run under test, and now the sharply defined shades of colour showed clearly how temperatures had varied by as much as 200 deg at points within half an inch of one another. Also demonstrated on this stand was "Gloscoat" strippable hot-dip protective coating, which provides a weatherproof, scratch-proof, cushioning jacket for tools, gauges and, in fact, almost any sort of component that can be dipped into a bath of molten thermoplastic at 180 deg C.

So much, then, for what we were able to observe during the time available for a tour of the indoor Birmingham B.I.F. Outside the big buildings were to be seen agricultural machinery, windmills and other such things that are happier out of doors, though being demonstrated among them were to be found fork-lift trucks, which work equally contentedly outdoors or in. I.T.D., Ltd., were there with their "Stacatrucs," one of which, in place of the usual lifting fork, had what might best be described as a giant pair of butter-pats, which clamped themselves gently but firmly on each side of whatever had to be lifted. Conveyancer Fork Trucks, Ltd., and Ransomes, Sims and Jefferies, Ltd., likewise showed, with their own particular equipment, just what dexterous little vehicles of this type can do. Conveyancer, incidentally, are members of the vast Owen organization, among whose companies are Electro-Hydraulics, Ltd., of undercarriage fame; apart from Rubery, Owen and Co., Ltd., (themselves also well known in the aircraft industry), the organization had no fewer than nine different companies exhibiting at the Fair.



Among the Castle Bromwich exhibitors was Joseph Sankey and Sons Ltd., specialists in welded sheet-metal fabrications. Their work for the aircraft industry includes gas-turbine components, of which the flame-tubes of the Comet's Ghost engines are an example. The material in this instance is Nimonic 75.

At the London B.I.F.

And so back to the Metropolis, where, as at Castle Bromwich, we discovered some—though naturally fewer—things of aeronautical interest. At Olympia, especially, your scribe found difficulty in keeping his mind on the business in hand, for the distractions were many and compelling. There was, for instance, a beer-proof piano, especially designed for Service messes—and it even had a foolproof case, evolved after a prototype model had succumbed to the efforts of an R.A.F. unit who suddenly discovered that they needed a "harp" for a Christmas play!

But, returning to sterner things, we found that a Wardour-Street firm, Films and Equipments, Ltd., were showing a 12-channel galvanometer recording camera, as used by the R.A.E. and in the development flying of the Brabazon, Comet and Valiant, among other aircraft. Designed primarily for strain-gauge recording, it is adaptable for many other purposes. On the same stand was a six-channel bridge amplifier for strain-gauge work and—representing another side of the business—an aircraft ground-starter plug tested up to 1,000 amp. For many years past, too, this firm has been making a range of multi-pin connector plugs for aircraft electrics.

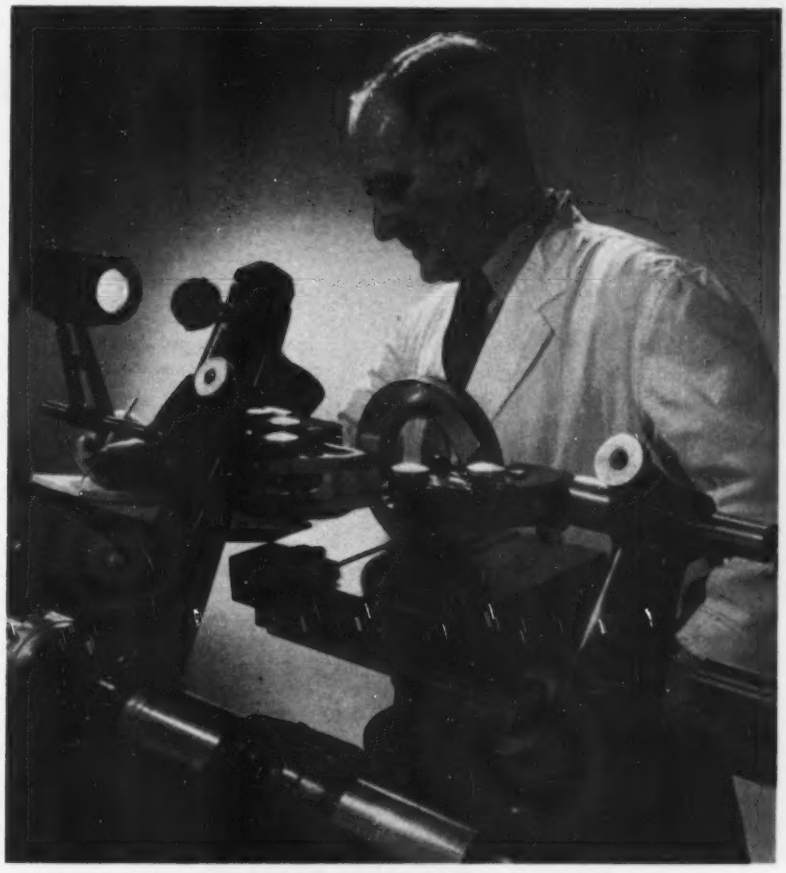
B.O.A.C. and B.E.A. had a combined stand decorated with some fine models—one of which we illustrated last week—of their current aircraft types. They also had plenty of aircraft seats in which weary visitors gratefully relaxed—subtle propaganda, this! As it would be a little difficult to bring a full-sized airliner into an exhibition building, an organization selling air travel must exercise ingenuity of this kind in getting its wares across; and a similar observation applies to the big petrol and oil companies, among whom Shell deserve a special word for the attractiveness and interest of their exhibits both at Olympia and Birmingham.

On the stand of Wirek (Electronics), Ltd., Edgware, we found an example of the magnetized-wire speech recorder specially designed for aircraft test flying, and used by the pilots of Boscombe Down and several constructors. This ingenious lightweight apparatus, which has obvious advantages over the old knee-pad method, was described in *Flight* of April 13th last year.

Over at Earls Court the main feature of interest, so far as we were concerned, was the plastics section, where well-known names—Bakelite, I.C.I., Tufnol, Thomas de la Rue, Tenaplas and so forth—were to be found. Two firms were making quite a feature of aircraft materials. One was Moulded Components (Jablo), Ltd., of Croydon, with their remarkable "Aero Jablex" lightweight thermal insulating material (shown fabricated into frozen-food containers) and their "Jabroc" densified resin-bonded laminate for press-tool construction, airscrews, pulleys, and other applications. The second firm was Thermo-Plastics, Ltd., of Dunstable; specialists in moulded aircraft plastics, they showed fibreglass radomes, canopies in Perspex, and examples of post-formed Bakelite ducting. There was also an example of Perspex-to-rubber-to-metal bonding, so essential in many types of aircraft transparency work.

The centre-piece of the Earls Court plastics section was the Farnborough all-plastic delta wing; but this is dealt with in some detail in the article on pages 626-627.

Altogether, a visit to this 1952 British Industries Fair was a rewarding experience; and if the business which the show brings should fall short of expectations, it will certainly not be the fault of the exhibitors or organizers.



Measuring precisely the diameter of a ring screw gauge on a British measuring machine.

Working for Britain's Future

Meticulous standards of accuracy have been fostered by Napier for close on 150 years. The breed of engineers who, in this century, have produced engines pre-eminent on land and water and especially in the air are men whose undeviating adherance to the principle of mechanical perfection has made the name of Napier known and respected throughout the civilised World.

NAPIER

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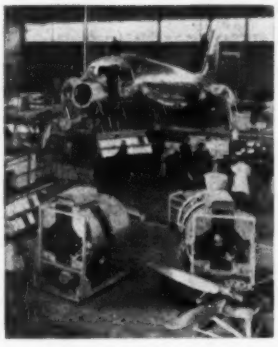
INSIDE BEA *No. 8 OF A SERIES*

More than mere maintenance. Every aeroplane is checked before every flight. And in addition machines are submitted to four different checks at every 55, 255, 510, and 1,000 flying hours. (Elizabethans—five checks—at 55, 105, 205, 410, and 800 hours.) All this is part of the very strict maintenance and overhaul system which BEA operate to maintain the "Certificate of Airworthiness."

Three main bases. Elizabethans are based at London Airport, Vikings at Northolt, and Pionairs and Islanders at Renfrew. For the major maintenance checks all aircraft are brought back to their own stations, where a comprehensive "float" of spares is kept. This means that if major components have to be removed and tested, substitute parts can be fitted and the used items returned to the BEA workshops for a thorough overhaul. Aeroplanes are therefore never on the ground for very long.



Repair docks. For full-scale repairs aeroplanes are sent to the "docks"—superbly equipped workshops where overhauls are completed with speed and efficiency.

Inspection. Just to double-check a certainty, every aircraft is scrupulously inspected before it leaves the Base after an overhaul. This checking branch is staffed by highly-trained engineers.

Training. All maintenance staff have wide and thorough aircraft experience. Elaborate schemes exist for training key maintenance personnel on new aeroplane types before their introduction into service. But expert technicians must be found for the future; and BEA use apprentice training schools attached to manufacturers' establishments, where selected boys of between 16 and 21 years are trained up to the very high standard demanded.

No rule too strict.—If necessity demands one check, BEA demand more. For the one overriding principle governing all BEA maintenance work is that *no rules can be too strict.*

BEA

BRITISH EUROPEAN AIRWAYS

CIVIL AVIATION

FUEL STRIKE SETTLED

DURING the past week operators all over the world have been forced to announce further service cuts as a result of the American oil strike, though at the end of last week conditions began to look more promising for a settlement, and a Mr. Knight, who is described as directing the strategy of the unions involved, said on the 15th, "we are calling the strike off." Nevertheless, a statement by the Ministry of Fuel and Power, made last week-end, said that full production was unlikely to be reached for ten days. Airline operators, therefore, are not by any means out of the wood.

Since the loss of Abadan, stocks of aviation fuel have been somewhat precarious, but United States suppliers have been able to meet demands to compensate for approximately one third of the world's requirements (excluding America and the Soviet countries) which have been lost.

B.O.A.C. have managed to maintain their Mayflower and Beaver services to New York and Montreal, and, of course, the Comet services are all unaffected. Nevertheless, the Corporation will suffer considerable loss. Sir Miles Thomas is quoted as saying that, should the service-cuts amount to 30 per cent, B.O.A.C. might lose £30,000 a day. B.E.A. cancelled 46 flights last Monday; the London-Paris schedules were nearly halved, and cruising speeds of Vikings and Elizabethans were reduced.

An official statement from I.A.T.A. representatives in Paris announced that the scheduled international operators who cut their fuel consumption by 35 per cent were expected to be running normally again by June 2nd. Transatlantic flights would not be reduced, but aircraft might have to land at Shannon or in the Azores to refuel instead of making the flight non-stop.

Like the airlines, the charter firms have been adversely affected, and several have been unable to meet their commitments.

Aggravating the 35 per cent fuel cuts (on the basis of the April consumption) was the fact that the full summer services did not begin until April 22nd, and thus the cuts represented almost 50 per cent reduction on normal May schedules.

CORPORATION TRAFFIC IN FEBRUARY

PASSENGER traffic on United Kingdom airlines in February, as indicated by M.C.A. figures announced last week-end, showed a continuing increase. The Corporations and their associates flew 67 million passenger-miles. International traffic accounted for 64 million passenger-miles, a 15 per cent increase over the total for February, 1952, while internal traffic was 24 per cent higher.

B.O.A.C. increased their total revenue traffic by 13 per cent to 8¼ million short-ton-miles. The overall revenue load factor reached 64.6 per cent, compared with 61.5 per cent in February, 1951.

B.E.A. carried more than 50,000 passengers and 1,000 short tons of freight, increases of 17 and 35 per cent respectively.

AUSTRALIA'S SOUTH AFRICA SERVICE

IN the course of a review of Australia's overseas and internal air services the Commonwealth's Minister of Civil Aviation, Mr. Hubert Anthony, has announced that the Qantas service between Australia and South Africa will be operating before the end of this year. This is not only of importance in providing another link with South Africa, but from the defence point of view it will provide an alternative air route to Britain if communications should be broken in the Far East as in the last war.

Mr. Anthony also said that work was proceeding on the big new airports at Sydney and Adelaide, and that a number of great new navigational aids were now coming off the production lines. Thirty new radio ranges were expected to come into use in the next two months at 13 airports. Ever-increasing numbers of Australians continued to use the airlines: more than 1,700,000 passengers were carried last year, compared with 1,200,000 in 1948, and 41,000 in 1938.

Other news from Australia mentions the preparation of Sydney Airport to receive the twice-weekly Comet service which Canadian-Pacific Airlines are to introduce on the Pacific routes. Representatives of the Canadian and Australian Governments have been discussing R/T. communications for the Comet, and meteorological services—particularly for upper-altitude information—in Australia, New Zealand and across the Pacific. Initially, Canadian-Pacific Comets will fly between Sydney and Honolulu, and on the twice-weekly service one Comet will call at Auckland and the other will fly direct from Sydney to Nandi in Fiji. Flying times foreseen are 2 hr 45 min between Sydney and Auckland, 4 hr 5 min between Sydney and Nandi, and 11 hr 30 min between Sydney and Honolulu. C.P.A. hopes to inaugurate the service in October.

ROYAL CONVEYANCE: The King of Saudi Arabia spends the summer at Taif, one hour's flight by DC-3 from Jeddah, and the winter at Ruyodh; these moves involve the transport of a large party of members of the household, some of whom travel in the royal DC-3 seen above, whilst others are flown by Saudi Arabian Airlines.

MORE SUPER-CONNIE ORDERS

LOCKHEED have recently announced additional orders for Super-Constellations; they come from six countries, including Spain and Columbia. The total of recent orders is 12—three for Lineas Aereas Espanolas (Spain) and one for Braathens (Norway), both these companies thus placing their first orders for modern four-engined equipment; three for Avianca (a subsidiary of P.A.W.A. in Columbia); two for Air India International; two for Qantas (Australia); and one more for K.L.M. The manufacturers state that the total order for the Super-Constellation is now 85, and for the Constellation (including those delivered) 392.

The first two prototypes of the Pratt and Whitney turboprop-powered Super-Constellations which have been ordered by the U.S. Navy are expected to fly during the summer of 1953. The top speed of the present model with Wright R-3350 engines is 379 m.p.h. The Navy's prototypes are expected to give 435 m.p.h.

LONDON-ICELAND RESUMPTION

FLUGFELAG ISLANDS' (Iceland Airways) well-known DC-4 *Gullfaxi* has resumed its weekly service between Reykjavik and London, after operating only as far as Prestwick during the winter. Flights leave Reykjavik every Tuesday at 0800 hr local time, and arrive at London at 1515. The return service begins two hours later, reaching Reykjavik at 2245 hrs.

Gullfaxi has been modified to carry 52 instead of the usual 40 passengers. This has enabled Flugfelag to reduce the single fare to £32 3s and the return fare to £57 18s (the former fares were £35 and £63 respectively).

The company's internal services have been expanded recently, as the other Icelandic airline, Loftleidir, no longer operates internally. Flugfelag now serve 24 points in Iceland, using

STRIKE FREIGHTER: One of the two Yorks which Eagle Aviation, Ltd., chartered to the United Africa Co. for three weeks to carry food and other freight between Kano and Lagos during the railway strike in Nigeria earlier this year. The two aircraft completed about 130 hr flying.

CIVIL AVIATION . . .

Dakotas and Catalinas. In addition, they operate one weekly return flight to Copenhagen.

Altogether they carried 3,740 passengers in the first three months of this year, an increase of 35 per cent over the similar period in 1951. There was an increase of 43 per cent in freight.

COMET FAR EAST FLIGHTS

LESS than two weeks after B.O.A.C. introduced the Comet on its U.K.-South Africa route, it has been announced that a series of 18 development and training flights are to be undertaken by the Corporation's Comets on the London-Singapore route. The first machine left London Airport on May 15th.

The purpose of the series is to familiarize aircrews, ground staff and flight-catering personnel with the route characteristics. Each round flight will be of nine days' duration, and there will be a full day's stop-over at Karachi. Outward the Comets will operate through Beirut; homeward they will use Cairo.

When in service the aircraft will be expected to complete the journey from London to Singapore in under 30 hours, as against approximately 60 hours (including a night stop at Colombo or Rangoon) with the present service by Argonauts.

The route for the Comet training flights will be :—first day : London, Rome, Beirut, Bahrein; second : Bahrein, Karachi; third : Karachi, Calcutta; fourth : Calcutta, Rangoon, Singapore; fifth : Singapore, Bangkok, Calcutta, Delhi, Karachi; sixth : Karachi; seventh : Karachi, Bombay, Colombo, Bombay, Karachi; eighth : Karachi, Bahrein, Cairo; ninth : Cairo, Rome, London.

While attending an I.A.T.A. traffic conference at Buenos Aires on May 14th, Mr. J. W. S. Brancker, B.O.A.C.'s chief delegate, said that the Corporation expected to have nine Comets in service by the end of 1952. The fourth B.O.A.C. Comet is due and ready for delivery this week.

SECOND PROTOTYPE of the S.N.C.A.S.E. S.E.3120 "agricultural vehicle" in flight. This new helicopter was designed with crop-dusting and other farming duties as its principal functions.

SALISBURY AND THE COMETS

REFERENCE was made recently (*Flight*, February 8th, 1952), to the plans for, and progress of, Salisbury's new airport. It is now learned that Sir Miles Thomas has arranged to send a team of experts to Kentucky Farm, Salisbury, to assess the expenditure that would be required to provide the minimum facilities there. Sir Miles believes that if a determined attack were made on the problems, the Comets could begin regular calls within six months. The 2,800-yd long strip is eminently suitable, he said, but the cost of a complete set of terminal buildings with all the technical facilities would be well over £500,000, which was probably more than the finance of the Colony would readily bear at this particular period of tight budgetary control.

Adequate facilities for Comet transit services to set down or pick up a limited number of passengers on a frequency of not more than two services per week could, it is claimed, be arranged for a tenth of that sum.

BREVITIES

SABENA's net profit in 1951 was £453,000 and the company's turnover for the year was nearly £9,000,000. Average load-factor on the company's routes which expanded to over 34,000 miles (the sixth largest network in the world) increased from 67 per cent in 1950 to nearly 73 per cent last year.

* * *

Airports, Ltd., of Gatwick, Surrey, announce that, following the death of Mr. A. M. Desoutter, Lt.-Col. F. C. C. Balfour is appointed managing director and Mr. F. J. C. Pole a director.

* * *

Further to a recent reference in *Flight*, it should be emphasized that the new Aer Lingus service between Dublin and Cardiff will not be inaugurated until June 12th.

* * *

Provisions which will in future govern non-scheduled flights between Britain and Switzerland by British or Swiss aircraft are outlined in M.C.A. *Information Circular No.* 44/1952. In-flight reporting of hazardous weather is the subject of *Circular No.* 45/1952.

* * *

In recognition of his "notable contribution to the progress of international civil aviation," Sir Miles Thomas was recently awarded the Order of the Cedar of Lebanon. The presentation was made in Beirut by Mr. Sami Shukair, director of Lebanese civil aviation.

* * *

Mr. Austin Tobin announced recently that Newark Airport, N.J., may re-open for full flying operations on November 1st—depending on the completion of a new £3,570,000 runway. The airport was closed on February 11th after a sequence of three serious airliner accidents.

* * *

Crewsair, Ltd., whose name was not among those included in the representative list of independent operators published last week, are at present making an average of seven monthly flights to the Gold Coast under Government contract, in addition to general charter work. The address of the company, which has five Vikings, is 11 Bruton Street, London, W.1.

* * *

The work of converting five B.O.A.C. Constellations for the new Mayflower service is being undertaken by Lockheed Aircraft Service at Burbank. As illustrated in *Flight* recently, the work involves a "three and two" seating arrangement capable of taking up to 70 passengers. Further modifications are the installation of Stratos cabin-blowers, a new galley, two extra emergency exits, and a public address system with five overhead loud-speakers and hand microphones for the flight deck and stewardess's station.

FROM THE CLUBS

A LONG-AWAITED scheme to assist private pilots has now been approved by the M.C.A., after negotiation with the Royal Aero Club, whereby owners of private aircraft can purchase Annual Housing and Parking Cards for use at State-controlled airfields. These cards will be issued only to holders of valid "red" Landing Cards.

In 1950—after previous unsuccessful attempts—the R.Ae.C. reinstituted negotiations which, backed by the results of a survey which they had conducted, pointed out to the Ministry that the rate of £2 per week which was being paid by the average private owner for hangarage was ludicrous, say, when compared with the rent of a semi-detached house, which is often less than this figure. At that time the hangarage fees were based on the area occupied by the machine, but it was the Club's suggestion that a revised method of charging fees—on a weight basis—should be introduced, and this proposal was finally adopted and came into force on May 1st, 1952.

The cost of the Housing and Parking Cards is £52 per year for aircraft of up to 2,600 lb loaded weight and £70 for those of between 2,600 and 4,000 lb; thus a substantial saving will be enjoyed by the private owner. Typical examples are: Tiger Moth, previous charge, £76 10s; new rate, £52 per year. Auster series, £93 10s; £52. Messenger, £95 14s; £52. Proctor, £122 2s; £70. Gemini, £89 2s; £70. The new scheme applies only to State-controlled airfields. Further particulars may be obtained from the Air Touring Department of the Royal Aero Club, 19 Park Lane, London, W.1.

THE Southern Aero Club is staging a luncheon patrol at Shoreham on Sunday, June 22nd, between 1130 and 1200 hr. The rules applying during the previous patrols will again be in force. In addition to the customary free breakfasts for those penetrating the defences without having their registrations taken, the first three pilots to land nearest to a sealed time within the half-hour will receive a prize. Members of the S.A.C. have undertaken to provide free transport for those visiting pilots wishing to spend an afternoon on the beach. As at the previous patrol, a height-judging competition will be held later in the day.

Incidentally, the Southern Aero Club dance (evening dress) is to be held tonight, May 23rd, in the Terminal Building at Shoreham, beginning at 8 p.m. Tickets (10s) will be available at the door.

ON Sunday, June 8th, the Royal Naval Flying Club is holding an At Home at the Royal Naval Air Station, Gosport, Hants. Club aircraft and private owners are welcome, and a buffet lunch will be provided. Arrivals should be timed to take place between 1145 and 1400 hr, and all aircraft should land to the right of the runway control van and taxi to the clubhouse at the southern end of the airfield. Telephone inquiries should be made to Gosport 89146 (Air Traffic).

VINTAGE TRIO: This happily informal photograph was obtained during the Vintage Aeroplane Club's recent rally at White Waltham. Seen on the right is David Ogilvy, hon. secretary of the V.A.C., and, centre, Ron Gillman, the chairman. J. H. Gattier (left) a U.S. serviceman and a keen vintage enthusiast, has recently purchased A. E. L. Coltman's Miles Hawk Major, G-ADMW, which he will take back to the States with him.

A CLUB with a record number of flying hours for April is the Wiltshire Flying Club, who recorded no fewer than 367 during this period, bringing their total since January 1st to 637. In seven days alone—the second week in April—they logged some 127 hr.

Also justifiably proud of its achievements is the Fair Oaks Flying Club, who flew 282 hr during April, and, incidentally, beat Wiltshire's total for the year by 20 hr, having recorded 657 hr (an increase of 274 as compared with the same period for 1951). The C.F.I., W/C. Arthur, personally flew 124 hr, his highest total to date for one month; two A.T.C. cadets and one club member obtained their licences, and six other A.T.C. pilots who started during April are well on the way towards obtaining their P.P.L.s. At least eight first solos are expected during this month.

It was at Fair Oaks, incidentally, that Mr. Will Way, the 59-year-old pilot, qualified for his P.P.L., 36 years after his first flight—in an Avro in 1915.

THE Shell-Mex and B.P. Pilot's Calculator, mention of which was made in *Flight* of last week, is obtainable at a price of 10s and not 2s as stated.

R.Ae.C. AVIATORS' CERTIFICATES

WE publish below another of the periodical lists of those who have qualified for Royal Aero Club Aviators' Certificates. The previous list, from No. 27,783 to No. 27,878, appeared in *Flight* of February 15th last. The names which follow are part of what will be the final list in the present series, for the certificates are no longer a necessary qualification for obtaining a P.P.L. The remainder of the final batch of names will be published in forthcoming issues. After that, the lists are likely to be short ones, containing the names of those who still, from personal choice, apply for, and are granted, certificates.

No.	Name	Club or School	Date
27,879	J. T. Collyer	Qualified Service pilot	10.1.52
27,880	D. W. H. Stevenson	" " "	10.1.52
27,881	R. J. Timlett	" " "	10.1.52
27,882	L. Preddy	" " "	10.1.52
27,883	B. H. Smith	" " "	10.1.52
27,884	J. C. A. Quinney	Coventry Aero Club	21.1.52
27,885	H. S. Honour	R.A.F. Cottesmore	21.1.52
27,886	L. C. Spargo	Qualified Service pilot	21.1.52
27,887	J. Shippobotham	R.A.F. Cottesmore	21.1.52
27,888	R. B. Power	" " "	21.1.52
27,889	D. R. Shrosbree	Qualified Service pilot	21.1.52
27,890	R. Hatfield	R.A.F. Cottesmore	21.1.52
27,891	J. F. K. McGrail	R.A.F. Syerston	21.1.52
27,892	J. E. Hawkins	Wolverhampton Aero Club	25.1.52
27,893	R. A. Weston	Strathtay Aero Club	25.1.52
27,894	B. D. Weston	R.A.F. Cottesmore	25.1.52
27,895	G. T. Lemon	Qualified Service pilot	25.1.52
27,896	J. S. Eynon	" " "	25.1.52
27,897	J. E. M'Kenzie-Hall	" " "	25.1.52
27,898	A. C. Capper	" " "	25.1.52
27,899	B. J. L. Greenland	" " "	25.1.52
27,900	L. T. Reid	" " "	25.1.52
27,901	R. T. Norman	" " "	1.2.52
27,902	T. L. Kelly	Redhill	1.2.52
27,903	A. W. Starkey	Luton Flying Club	1.2.52
27,904	C. M. B. Horsfield	Experimental Group	1.2.52
27,905	M. R. Huckins	Qualified Service pilot	1.2.52
27,906	J. M. Howard-Johnston	Feltwell	1.2.52
27,907	K. W. Honey	Airways Aero Club	4.2.52
27,908	T. K. Baruah	Air Service Training	5.2.52
27,909	A. H. Tobin	Portsmouth Aero Club	5.2.52
27,910	J. E. Hutchinson	" " "	5.2.52
27,911	W. R. King	Qualified Service pilot	5.2.52
27,912	J. F. Shoemaker	Current P.P.L.	6.2.52
27,913	H. Meisl	Qualified Service pilot	8.2.52
27,914	M. D. Hill	Wolverhampton Aero Club	8.2.52
27,915	R. New	Qualified Service pilot	8.2.52
27,916	M. C. Hargreaves	Northants Aero Club	8.2.52
27,917	D. G. Mather	Qualified Service pilot	8.2.52
27,918	D. W. R. Gibson	Airwork, Digby	8.2.52
27,919	M. J. Little	R.A.F. Syerston	8.2.52
27,920	P. F. Cawthorn	" " "	8.2.52
27,921	J. D. Beech	" " "	8.2.52
27,922	F. R. Pearson	" Oakington "	8.2.52
27,923	H. G. Keeling	" " "	8.2.52
27,924	W. G. Marsh	" " "	8.2.52
27,925	B. B. Long	" " "	8.2.52
27,926	A. D. Laycock	" " "	8.2.52
27,927	E. R. Howard	Southend Municipal Flying School	11.2.52
27,928	F. Englander	Airways Aero Club	11.2.52
27,929	B. A. MacCaw	Qualified Service pilot	15.2.52
27,930	A. McLaughlin	Strathtay Aero Club	16.2.52
27,931	R. E. Phillips	Liverpool Flying Club	16.2.52
27,932	C. G. B. Lloyd	Wolverhampton Aero Club	16.2.52
27,933	D. Maclachlan	Airways Aero Club	16.2.52
27,934	D. A. Lester	Wolverhampton Aero Club	16.2.52
27,935	R. G. Cutler	Denham Flying Club	16.2.52
27,936	J. A. Watt	Strathtay Aero Club	16.2.52
27,937	J. G. R. Godwin	Southend Flying School	16.2.52
27,938	V. H. Hallam	Qualified Service pilot	16.2.52
27,939	E. Martin	" " "	16.2.52
27,940	K. H. Mude	R.A.F. Syerston	16.2.52
27,941	J. W. Ross	Qualified Service pilot	16.2.52

FIRST MAJOR RACE of 1952

Pat Fillingham (D. H. Chipmunk) Wins the Goodyear Trophy

IT was particularly appropriate that Wolverhampton Airport should again have been the venue for the Goodyear Trophy Race, for this year the Goodyear Tyre and Rubber Co., whose factory is alongside the airport, and who presented the premier award, celebrate their 25th anniversary. The contest—the fifth of the series—was again organized by the Wolverhampton Aero Club, and it was notable as being the first event carrying the new air-racing championship points.

Last Saturday, May 17th, was so far the hottest day this year: at Wolverhampton, the sun shone continuously from an almost cloudless sky. But there was a cooling breeze, and flying conditions were not unpleasant, the heat haze—which had been considerable earlier—having largely cleared by the start at 3 p.m.

The course was unchanged from that of 1951—Wolverhampton Airport; Pillarton Hall, Penkridge; Wheaton Aston Aerodrome; Ackleton and Wolverhampton, a total distance of 31½ miles. The race was flown over three laps, without preliminary heats.

First off was E. F. Wild in a cream Piper Cub. Taking off westwards, he climbed gently to the first turning point—over a field by the railway about 300 yd from the airport—and then turned smartly on to a reciprocal heading, setting course at 200ft. Twelve minutes then ticked away before C. Gregory's Taylorcraft got going, after which a steady stream of aircraft were flagged away. Ron Paine (Hawk Speed Six), the scratch man, carried a handicap of nearly 35 minutes. The take-off runs appeared long, possibly due to the hot weather.

Little change of order was apparent after the first lap. The two Messengers were battling it out very close together, while Dunkerley—his Cirrus Minors buzzing like sewing machines—had clearly reduced his handicap greatly; in fact, just as Somers made his usual violent pylon turn, Dunkerley was entering a slightly more gentle one a few feet higher.

But even at this stage it was obvious that some aircraft were carrying far too much handicap. Tom Hayhow's Aiglet Trainer was one such, while both the Moth Minor and the Globe Swift appeared to be quite out of the running.

After Ron Paine had gone hareing after the rest of the field, S/L. Findley's Avro 621 was observed gently orbiting the airfield at about 2,000ft; this fine old aircraft had done a creditable first lap, but its size removed any suggestion of speed. Shortly afterwards, the Piper Cub was also seen to have retired; with the Avro it was kept in the circuit until the completion of the race.

After lap No. 2, things began to fall into shape. Dunkerley was now ahead of Somers and Jimmy Rush had clearly drawn well away from G. C. Marler—similarly flying a Falcon—and also passed the Swift. At this stage it looked as if Farley (Autocar), Loveridge (Hawk Trainer), Gibson (Messenger), Wood (Proctor) and Dunkerley were all likely to be placed.

In spite of the fine weather, the crowd at Wolverhampton Airport last Saturday was not of large proportions. The major event of the display, the Goodyear Trophy race, was won by Pat Fillingham, seen below with his wife and the Chipmunk immediately after the race. Mr. Fillingham is de Havilland's chief production test pilot. "Flight" photographs

Some ten minutes then elapsed before the winner appeared. Low on the western horizon came a single-engined aircraft, closely followed by a whole host of others; the handicapping was clearly better than some people had thought. But there was no doubt about the winner—it was Pat Fillingham's Chipmunk, which had not previously attracted much notice. It swept across the line well ahead of Loveridge and Farley. F/L. Gibson and W. P. Bowles were next home, followed by the four Throttle Benders competing—Dunkerley, Somers, Paine and Rush, in that order.

Worth noting was the almost incredible performance of the Cirrus-Minor-powered Gemini; it will indeed be remarkable if, in future races, Dunkerley manages to conceal something from the handicappers. Fastest lap—9 min 42 sec—was Ron Paine's second; this corresponds to about 196 m.p.h.

The prizes were presented by Mrs. W. A. Hazlett, the wife of Goodyear's managing director.

The usual excellent flying display took place during the afternoon. Events included a contribution by Ben Gunn in a Balliol; Tiger Moth formation flying by F/Ls. Gibson, Fagg and Marsh of 25 R.F.S.; exposition of the Aiglet Trainer by S/L. Ranald Porteus; fly-pasts by a Wyvern T.F.4; Tiger aerobatics by F/L. Marsh; sailplane aerobatics by an Eon Olympia, towed to height by a Fieseler Storch (F/Ls. Kearley and Marsh from R.A.E.); Meteor 7 demonstration by F/L. Severne from C.F.S.; and jumps from a captive balloon made by members of the 18th Battn. Parachute Regt., T.A.

GOODYEAR TROPHY RACE RESULTS

Pl.	Pilot, Aircraft and Engine	Reg.	Speed (m.p.h.)	Start order	H'cap time m. s.	C'ship pts.
1.	P. Fillingham (Chipmunk, G.Major I)	KDN	142	11	23.05	22
2.	S/L. Loveridge (Hawk Trainer 3, G.Major I)	JJI	126½	6	18.30	20
3.	G. A. Farley (Autocar I.S.B, G.Major I)	JYY	121½	5	16.35	18
4.	F/L. Gibson (Messenger 2A, C.Major III)	JOE	129	9	19.25	16
5.	W. P. Bowles (Messenger 2A, C.Major III)	JYZ	133½	10	21.05	14
6.	F. Dunkerley (Gemini 1A, C.Minor IIa)	KKB	175½	19	31.30	12
7.	J. N. Somers (Gemini III, G.Major I.C.)	KDC	170½	18	31.15	11
8.	R. R. Paine (Hawk Speed Six, G.VI. (P.)	DGP	190½	20	34.55	10
9.	H. Wood (Proctor 5, G.Queen II)	HWR	146	14	25.45	9
10.	S/L. J. Rush (Falcon VI, G.VI)	ECC	167	17	30.50	8
11.	J. R. Batt (Chilton D.W. 1A, Train 4T)	FSV	122½	7	18.40	7
12.	C. Gregory (Taylorcraft D, C.Minor I)	HGZ	107	2	12.00	6
13.	D. C. Jemmett (Hawk Trainer 3, G.Major I.C)	KPE	135	12	23.45	5
14.	T. W. Hayhow (Aiglet Trainer, G.Major I.C)	MOS	137	13	24.25	4
15.	G. C. Marler (Falcon VI, G.VI)	DTD	160	16	30.50	3
16.	L. E. Mason (Autocrat, C.Minor II)	IGH	108½	3	14.05	2
17.	D. R. Robertson (Moth Minor, G.Minor)	FPN	114	8	19.00	2
18.	G. F. K. Donaldson (G.C.1B Swift, Continental)	HUU	139	15	28.10	2

Prizes: Trophy, replica and £100, P. Fillingham. Second prize (£50), S/L. Loveridge. Third prize (£25), G. A. Farley.

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SERVICE AVIATION

Royal Air Force and Naval Aviation News

Queen's Colour for Halton

IT is announced that Her Majesty the Queen intends to present her Colour to No. 1 School of Technical Training, Halton, on July 25th.

This will be the third Royal Colour to be presented, the other two being those given to the R.A.F. in Britain and to R.A.F. College, Cranwell.

A.A.F.C.E. Integration

ON Tuesday of last week representatives of the various Western European air forces met at Fontainebleau to discuss the problems connected with the integration of national air forces under the command of General Lauris Norstad.

Those taking part included Air Chief Marshal Sir John Baker (Britain), General François Léchères (France), General Lucien Leboutte (Belgium) and General I. A. Aler (Holland).

R.C.A.F. in France

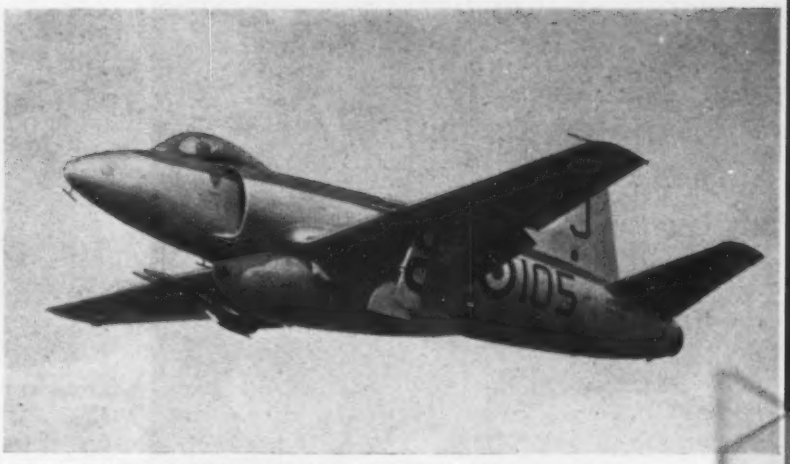
UNDER the North Atlantic Treaty, negotiations for the construction and use of airfields in France by the Royal Canadian Air Froce have led to an airfield near Metz being put at the disposal of the Canadians.

When he made this announcement Mr. Brooke Claxton, the Canadian Minister of Defence, also said that the construction of additional facilities was proceeding.

Appointments

UNTIL recently the S.A.S.O. at No. 1 Group, Bomber Command, G/C. H. R. Graham, D.S.O., D.F.C., has now been appointed Director of Navigation and Control at the Air Ministry. He will have the acting rank of Air Commodore.

Another appointment recently announced is that of G/C. W. F. Langdon, C.B.E., who, also with acting rank of Air Commodore, will leave his post as O.C. No. 14 Maintenance Unit and become S.A.S.O. No. 41 Group, Maintenance Command. This is a vacancy created by A. Cdre. Nobb's appointment as Director of Equipment at the Air Ministry.



ATTACKER FIGHTER/BOMBER: Equipped with attachment points for bomb-carriers or rocket rails, Vickers-Supermarine Attackers now being delivered to Naval Aviation are designated Attacker F.B.1. Machines of earlier batches were F.1s. No under-wing loads are in place in this view of an F.B.1, which does, however, convey an excellent idea of the size of the ventral tank.

Queen's Medal for R.A.A.F. College

THE Queen has approved the annual award of a gold medal to the senior cadet gaining the highest marks in all subjects at the R.A.A.F. College, Point Cook. The first award has been made to P/O. D. N. Robertson, who also won the Sword of Honour.

Cadets in Carrier

LAST Monday and Tuesday more than 100 members of the Combined Cadet Force were on board the carrier H.M.S. *Illustrious* (Capt. C. T. Jellicoe, D.S.O., D.S.C., R.N.). They came from schools in many parts of the country, including Blundells, Harrow, Sherborne, Wellington, Westminster and Winchester.

The programme they watched included refuelling a destroyer at sea, a submarine attack on a carrier, torpedo attacks by M.T.B.s, a helicopter rescue and the operation of Attacker aircraft.

Airfield Food Production

DURING 1951, R.A.F. unit farms and gardens produced food to the value of £329,509, which figure is nearly £100,000 greater than that of the previous twelve months. The average acreage of the 152 unit farms concerned was 15.2.

In 1944, when the scheme was at its peak, there were 611 unit farms and gardens, with a combined acreage of 6,329.

Harvard Courses

FOR qualified Reserve and cadet pilots capable of flying Harvard aircraft, Flying Training Command has instituted 15-day courses designed to raise Harvard flying by the Reserve to as high a standard as is possible in such a short period.

These courses, which will start on June 15th, can be taken in lieu of the normal 15-day annual continuous training. Where this has already been completed, a 15-day period of training will be automatically authorized.

The Harvard course is not open to pilots of the R.Aux.A.F. who were called up last year for three months' continuous training; National Service pilots; R.A.F.R.O. pilots; and Class E personnel who were transferred to the Reserve between July 1st, 1951, and February 1st, 1952.

The periods available are continuous until September 21st, but it is not yet decided at which R.A.F. stations the courses will be given.

AT UPAVON: Central Flying School's 40th birthday brings to mind this group, taken during the first visit by "Flight" to C.F.S.—in 1914. Third from the left, standing, is Capt. A. G. Board, who retired as an air commodore in 1941; Major Trenchard, now Marshal of the R.A.F. Lord Trenchard, is seated third from the right. On his left is Maj. E. L. Gerrard, who retired as an air commodore in 1923; the right-hand figure, sitting, is Capt. T. I. Webb-Bowen who, in 1941, retired as A. V-M. Sir Tom I. Webb-Bowen.

NAVAL INTEREST IN COASTAL AFFAIRS: (Left) The Duke of Edinburgh with Air Marshal Sir Alick Stevens during his visit to Coastal Command headquarters on Tuesday of last week. (Above) Presenting the Dunning Trophy to S/L. E. F. J. O'Doire, the C.O. of No. 210 Squadron, at St. Eval, after flying down to Cornwall from Northolt last Friday.

SERVICE AVIATION . . .

The Duke with Coastal Command

FOLLOWING his recent visit to Coastal Command H.Q. (see photograph above), the Duke of Edinburgh inspected the Coastal Command station at St. Eval in Cornwall. On Friday last he made the journey in a Vickers Viking of the Queen's Flight and was received by the A.O.C-in-C. Coastal Command, Air Marshal Sir Alick Stevens, and A.V-M. T. C. Traill, A.O.C. No. 19 Group.

For nearly five hours he remained on the station, and during the visit he presented the Dunning Memorial Trophy to S/L. E. F. J. O'Doire, the commanding officer of No. 210 Squadron, which won the trophy for its successes at the Joint Anti-submarine Warfare School at Londonderry. The trophy was originally presented in 1917 to commemorate the achievement on April 2nd of that year of Sqn. Cdr. H. S. Dunning in being the first British pilot to alight on a ship under way. He was killed whilst making a second attempt.

The Duke was also afforded an opportunity to go over one of the Neptunes recently flown to St. Eval from the Lockheed factory in California.

A Better Average

IN the report concerning Air Chief Marshal Sir Hugh P. Lloyd's return flight in a Canberra from Canada, the average speed was given as 389.5 m.p.h. for the 2,305 miles. This should, of course, have read knots, making the average speed 448.3 m.p.h.

R.N.V.R. Annual Training

FOR their annual period of continuous training, No. 1840 Squadron (Ford) and No. 1833 Squadron (Bramcote) will embark in the light fleet carrier H.M.S. *Triumph*. The ground party will go on board at Portsmouth and the squadron aircraft will land-on from Ford on June 9th. No. 1840 has Fairey Fireflies and No. 1833 Supermarine Seafires.

During the two weeks the squadron are afloat there will be deck landing and catapult practices, weapon training against moving targets, tactical air fighting and anti-submarine exercises.

Triumph will sail north from the Channel to the Firth of Forth area and, after calling at Rosyth, will probably visit a Continental port.

Home Fleet Assembled

THE Home Fleet, which assembled at Portland on Saturday last, included the fleet carrier H.M.S. *Indomitable*, wearing the flag of the Flag Officer Heavy Squadron (Rear-Admiral Caspar John).

Two other carriers, which joined from the Training Squadron, were H.M.S. *Indefatigable* and H.M.S. *Implacable*, wearing the broad pennant of the Flag Officer, Training Squadron (Commodore B. I. Robertshaw).

Extensive sea exercises are scheduled for the Home Fleet for June, and subsequently visits will be made to ports of continental N.A.T.O. countries.

Malta to Ceylon

SIX Lancasters of No. 38 Squadron last week flew from Malta to Katunayake in Ceylon, from where they will take part in fleet exercises.

No. 38 Squadron, which is normally stationed in Malta, is a maritime reconnaissance unit. S/L. E. D. T. Norman is in command.

R.N.Z.A.F. Appointments

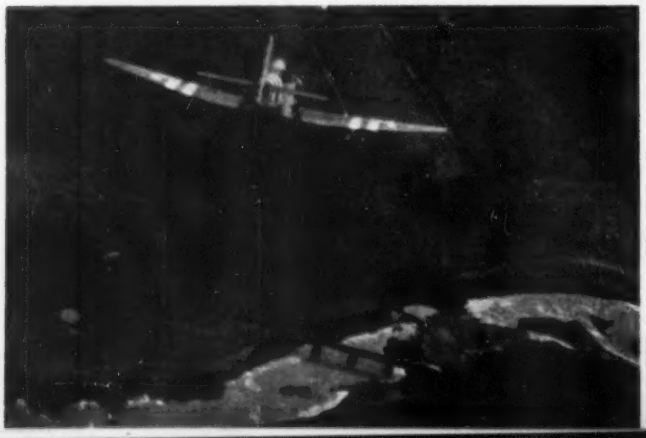
UNTIL recently the commanding officer at Ohakea, G/C. R. F. Dix has been appointed Director of Training at Headquarters.

G.C. I. G. Morrison, who has recently returned to New Zealand after attending a course at the Joint Services Staff College in Britain, will take over command of Ohakea.

"Castanets"

DURING next month a major naval and air exercise will be held involving over 250 ships and 400 aircraft. Code-named "Castanets," it will be under the general direction of Admiral of the Fleet Sir Arthur Power, acting in his capacity as C-in-C. Home Station (Designate) and Allied C-in-C. Channel. In overall control of the maritime air forces will be Air Marshal Sir Alick Stevens who, in addition to being A.O.C-in-C. Coastal Command R.A.F., is Allied Maritime Air C-in-C. Channel.

The main objects of "Castanets" will be to exercise the war-time Command organization of the Channel and Home Commands, and to rehearse allied maritime forces in war operations, particularly those involved in the protection of trade and in mining counter-measures.



GAPPING A BRIDGE: Lt. (E) P. I. Normand, flying a Sea Fury from H.M.S. "Glory", releases his second bomb during a dive-bombing attack against a railway bridge in western Korea. "Glory" has recently been relieved by H.M.S. "Ocean." Old craters are visible.

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

The South Kensington Murals

THE murals in the Science Museum aeronautical collections so adversely criticised in your Correspondence columns by Mr. Roger Baker and Mr. C. Rupert Moore, A.R.C.A., were painted by Mr. Russel Platt, A.R.C.A., then a senior student working under the guidance of Professor Moynihan of the Royal College of Art. For his work on these murals Mr. Platt was awarded a silver medal by the College.

The Royal College of Art is the joint occupant with the Science Museum of the building housing the aeronautical collections, and the entrance hall is common to both occupants. We cannot dictate to the Principal and Professors of the College on matters of artistic appreciation or licence, but we should certainly not recommend a study of murals but of full-sized aircraft, photographs or models, to those in search of technical "accuracy."

London, S.W.7. W. O'DEA.
Keeper, Department of Aeronautics, The Science Museum.

Registrations and Personalities

AS an aviation enthusiast for the past fifteen years, and hon. secretary of the Birmingham and District Aviation Club, I would like to take the opportunity of thanking you for the current fashion in *Flight* of giving the full civil registration letters of civil aircraft in your reports and articles. This procedure not only assists us in extending our records, but also gives an aircraft a "personality" which it does not get when referred to merely as a type. I am certain that your inclusion of registration letters will encourage readers to take a greater interest in civil aircraft, a thing which we all wish.

Birmingham 2. P. F. WRIGHT.

Da Vinci's Genius

AT the quincentenary exhibition of Leonardo da Vinci's work now at the Royal Academy, London, there are, as would naturally be expected, drawings and models of his flying machines —aeroplanes and helicopter, designed by him in the years A.D. 1505-6.

On closely examining the drawings and models, in conjunction with the separate drawing of his aeroplane wing, one is struck by their close resemblance to the soaring machine (or glider) on which Otto Lillienthal made the first authentic flights ever made by man, in the year 1896 (if one excepts the accidental twelve-yard hop made by Sir Hiram Maxim's steam aeroplane at Baldwyns Park, Bexley, Kent, in 1894). The writer is of opinion that if da Vinci had abandoned his idea of flapping his wings (ornithopter flight) and had constructed rigid wings adapted for soaring only (as per Lillienthal) there is but little doubt that he could have accomplished soaring flight on his apparatus in 1505, quite as satisfactorily as did Lillienthal approximately 400 years later. Had da Vinci been lacking in the physical courage to embark personally on these flights (which is improbable) there would have been adventurous young Italians of his day ready and willing to undertake this pioneer work.

This remarkable man's genius was outstanding. The exhibition shows drawings of frogmen, tanks, quick-firing guns and other mechanical devices, many of them 400 years before their time, therefore it is not surprising that the majority of his inventions existed as drawings and designs only.

London, S.W.17. E. V. HAMMOND.

Canada's Aircraft Industry and Manpower

I HAVE just read Part I of "Canada's Aircraft Industry," by James Hay Stevens, in your issue of April 4th and was interested to see his paragraphs concerning "leakage" of engineers from Canada to the U.S.A. It would appear that your contributor has collected some very biased information on this subject. As one of the said bodies who "leaked" from England to Canada and subsequently to the U.S.A., I would like to comment upon some of the statements made.

In the first place let it be noted that the Canadian aircraft companies are themselves guilty of exactly the recruiting tactics of which they complain. In recruiting experienced engineers from England and from the U.S.A. (and also in Canada), do they consult the companies whose manpower they are enticing away? I think not.

During the two-and-a-quarter years I was in Canada, I was offered employment by two other aircraft companies, one of whom had gone so far as to send a representative over a thousand miles to interview candidates in the home town of its competitor.

A second fact which your correspondent does not mention is that the amount of aircraft design-work which is being done in Canada is extremely small. To my knowledge only one company is designing its own airplanes, and another company is designing part of an airplane under subcontract from the U.S.A. Canada has a long-standing record of buying her designs ready-made in either Great Britain or the U.S.A. The opportunity in Canada for experienced design-engineers is therefore quite small and will remain so as long as this policy continues. It is not surprising that engineers who enter Canada and are disappointed there should look over the border to the U.S.A., where the trained engineer is offered so much more opportunity.

The fact that salaries in the U.S.A. are higher, coupled with a lower cost of living (not *higher*, as your correspondent states) and considerably lower taxation, naturally accelerates this movement over the border. As soon as Canada offers the aircraft design-engineer a real opportunity and an equivalent standard of living this movement will cease and could easily be reversed.

Dallas, Texas H. A. CARLESS, A.F.R.Ae.S.

"Angels One Five"—Once More

THE letters (*Flight*, April 4th and May 2nd) from Mr. Alex Thorne imply that he can accurately recall war-time procedure and conditions which are forgotten by those who took part in the 1940 scrap with the Luftwaffe. In my case I have something rather stronger than my admittedly often faulty memory—the diary which I kept throughout 1939 to 1943. In support of the statements which I made, may I quote a few extracts?

(1) July 29th, 1940: "At half-past seven, the squadron [501] arrived at Hawkinge, and immediately after refuelling, took the air again, scrambling in flights of three. . . ."

(2) August 18th, 1940: "At 12.35, 501 Squadron was scrambled to angels 20 (twenty thousand feet), near Canterbury, and told to look out for a large force of enemy fighters and bombers. . . ."

(3) May 12th, 1940 (France): "I closed in to 450 yards from dead astern, opened fire in short bursts which eventually silenced the rear gunner of the He 111, then, at 250 yards range, the Heinkel dropped its undercarriage and dived straight to the ground. . . ."

This diary was kept from day to day, and has not been compiled from memory at a later date. I think these extracts should prove the point about the significance of "angels," whether squadrons scrambled in formation (I also have a photo of the squadron taking off in formation), and whether or not enemy aircraft were ever shot down from stern attacks. As another correspondent pointed out, enough shots from camera-gun film have been made public for Mr. Thorne to realize that probably the majority of successful attacks were made, or at least ended up, as stern attacks.

Peckleton, Leicester. D. A. S. MCKAY.

[The merits and/or demerits of the film *Angels One Five* have now had a good airing, and unless anyone has a very strong claim to a last word, we feel that this correspondence should now cease.—ED.]

Face-saving

TILL recently and even now, conventional, forward facing seats are used, but due to our experience, and coming to see the disadvantages, it is suggested to change over to rear facing seats.

Australia seem to be the first country to put this into practice, and we see that four British planes, one of them the Comet jet airliner, are to experiment with rear facing seats.

Here, I would like to suggest that, either forward facing or rear facing seats, the danger is more or less to the same degree, that is in a crash with forward facing seats you might break your front of the body and there is a chance at least (if existing) you can grab your front seat back, with rear facing seat the only portion which is unsupported is the head.

In this position, in a crash I feel if the impact is such the neck gets a backward thrust, we will have a snap at the vertebra and sure death.

I suggest, that *side-facing seats* would suit very well because in this position, under an impact we will be sitting side ways and may hope to live with the loss of a limb or leg instead of getting a broken face or head injury, where as with the front or rear-facing seats give a lesser chance of survival, because mostly impact is forward.

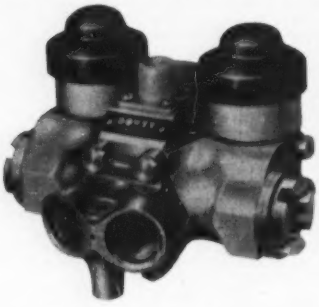
Bangalore, India. G. T. ARAASU.

ELECTRO-HYDRAULIC SELECTOR VALVE

MUCH high-pressure piping from the pilot's cockpit to numerous hydraulic jacks can be eliminated if the aircraft hydraulic system is made subject to electric remote control.

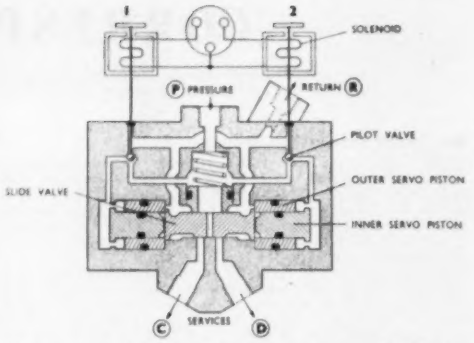
Known as the Hydel, an electro-hydraulic selector valve has recently been added to the Dowty range of products. Basically, it consists of a hydraulic valve operated by two solenoids which are controllable from the cockpit by any suitable switch. Although light and compact, the valve has been designed to permit a high flow-rate with a minimum pressure-drop. Various types are in production, including four-way, three-way, and two-way units, with twin or single solenoids; a neutral position can be provided and the selected service can be arranged to remain either open or closed after de-energizing.

Considering the type 4600-Y four-way, three-selection (blind



The Dowty Hydel valve model 4600-Y (left) employs two solenoids which are numbered 1 and 2 in the sectional view (upper right). A service-to-return head loss of less than 100 lb/sq in is recorded with a flow rate of 10 gal/min.

neutral) valve as being typical, the operating sequence is as follows: In circuit, the valve is supplied with hydraulic fluid under pump pressure at P (see accompanying drawing) and is connected to the operating jacks (or similar actuators) at C and D; the return line enters at R. With both solenoids de-energized the pump pressure is contained within the servo cylinders and the housing



of the spring-loaded piston. The servo pistons are held against their inner stops, thus centralizing the slide-valve to close both service ports C and D.

When, for example, solenoid 1 is energized, it moves a pilot valve off its upper seat and on to its lower seat, cutting off the pressure to the related servo cylinder and reducing the contained pressure. The other servo piston then moves forward unopposed, pushing the central slide-valve port over the outlet C and thus placing the pump in direct communication with the actuator served by this outlet pipe. The passage on the right-hand of the slide-valve, now located over the open port D, permits the return flow along R.

When the solenoid is de-energized, the pilot valve returns to its upper seat and restores pressure equilibrium. Operating times are very rapid; a service can be selected in 0.12 sec and return to neutral made in 0.03 sec.

The solenoids are rated for voltages of between 22 and 28.5; in the event of electrical failure the slide-valve automatically returns to the central (off) position and thus contains operating pressure in the selected circuit. For test purposes, the valve can be operated by depressing the flexible protecting caps over the solenoids.

The Hydel valve series can be used in any hydraulic system with an operating pressure of 4,000 lb/sq in or less; the temperature limits are —54 deg C and +70 deg C, and the normal flow capacity 20 gal/min. The twin solenoid unit type 4600-Y weighs 2.5 lb and the single solenoid pattern 1.9 lb.

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A LARGE new factory at Gorseinon, near Swansea, will shortly be opened further to increase the productive capacity of the Minnesota Mining and Manufacturing Co., Ltd. (formerly Durex Abrasives, Ltd.), the makers of an enormous range of abrasive papers and cloths, adhesives and coatings, pressure-sensitive adhesive tapes, magnetic recording tapes, and non-slip surfacing. There can, indeed, be few industries in this country which do not employ "3M" products of one kind or another. With the new factory—a well-designed, light and airy building—in full production not only will industry benefit from the increased output of the company's products, but the employment factor of what is now known as a "development area" will receive a fillip.

AMERICAN HYDRAULIC PUMP

A VERY compact design of aircraft hydraulic pump is announced by the Hamilton Standard division of United Aircraft. Operating on an "unusual" (but unstated) system, the pump is claimed to deliver up to 25 gal/min at 3,000 lb/sq in. The driving speed of 8,250 r.p.m. would appear to render the pump suitable for direct drive from a gas turbine. Already in limited production, the unit has been chosen for use in the Chance Vought F7U-3.

THE R.A.F. AND ROAD SAFETY

PUBLIC attention of late having been directed with increasing emphasis towards the subject of road safety, it is of topical interest to record that the Royal Air Force has under consideration the question of equipping all Service long-chassis vehicles with rear and side light-reflectors of a new and outstandingly effective type.

Known by the name "Webslight," and manufactured by the Cheshire Engineering Co., Ltd. (Webslight Division), Burwood House, Caxton Street, London S.W.1, the reflector signs take the form of a coating of minute glass beads (45,000 sq in) bonded to a light-alloy base plate with a special lacquer. Such is the construction of the signs, it is claimed, that they meet all B.S.S. requirements in respect of real-light colour both by day and by night, are impervious to weather, require no maintenance, and are exceedingly difficult to damage. They are available in virtually any required design and size.

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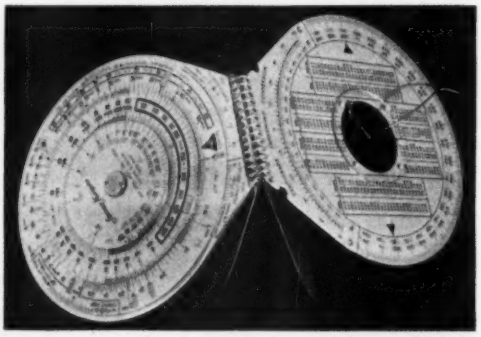

This pocket computor can be used to solve a remarkable number of navigational problems as well as being a handy circular slide-rule and several other things. Known as the Swissair Navigator, it is beautifully finished in anodized aluminium and has a diameter of four inches. It is now available in this country, price £4 4s. from Hudes Merchandising Corporation, Ltd., 52, Gloucester Place, London W.1.

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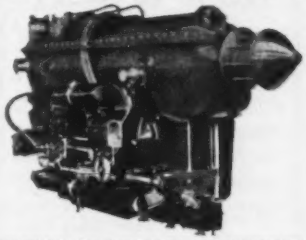

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PLANNING engineer (aircraft) required by Percival Aircraft, Ltd., Luton Airport, Beds. Considerable practical experience of manufacture of metal airframe components and production planning essential qualifications.—Apply to Manager, Employment Exchange, Luton, giving full details of age, qualifications, experience and salary required. [0597]

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SENIOR and junior technical assistants are required for experimental and development work on gas turbines for aircraft. Candidates should have an Engineering Degree or its equivalent. Previous experience of this type of work is desirable, but not essential.—Reply, giving details of qualifications and experience, to Reference JBL, Box 3936. [8106]

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APPLICATIONS are invited from design draughtsmen and stressmen, also technical assistants with combined design and performance experience for work on both reciprocating and gas turbine aero engines.—Applications should state full particulars of experience and qualifications and should be addressed to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [8092

GRADUATE in aeronautical or mechanical engineering is required for work concerned with stress calculations on mechanisms, gear trains and dynamically loaded light alloy structures in an experimental research team at Stanmore.—Apply to the Staff Manager (Ref. GBLC/S.26), Research Laboratories of The General Electric Co., Ltd., Wembley, Middlesex, stating age, experience or qualifications. [8145

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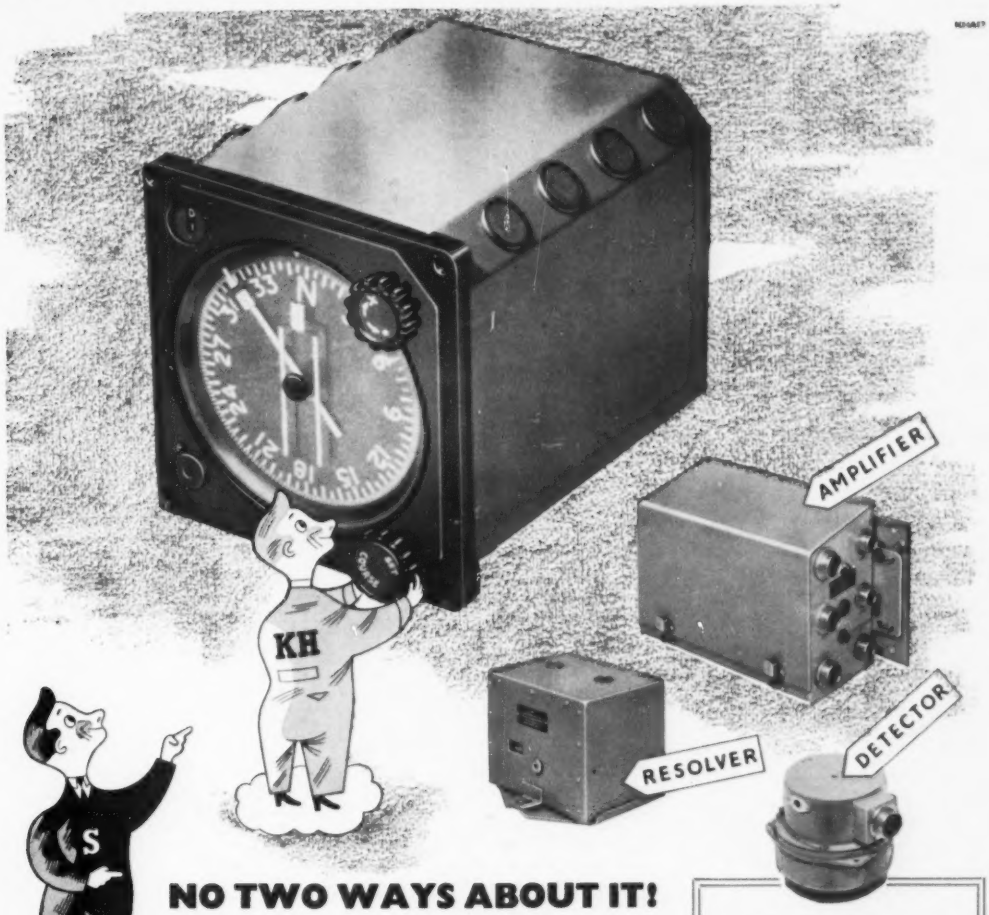

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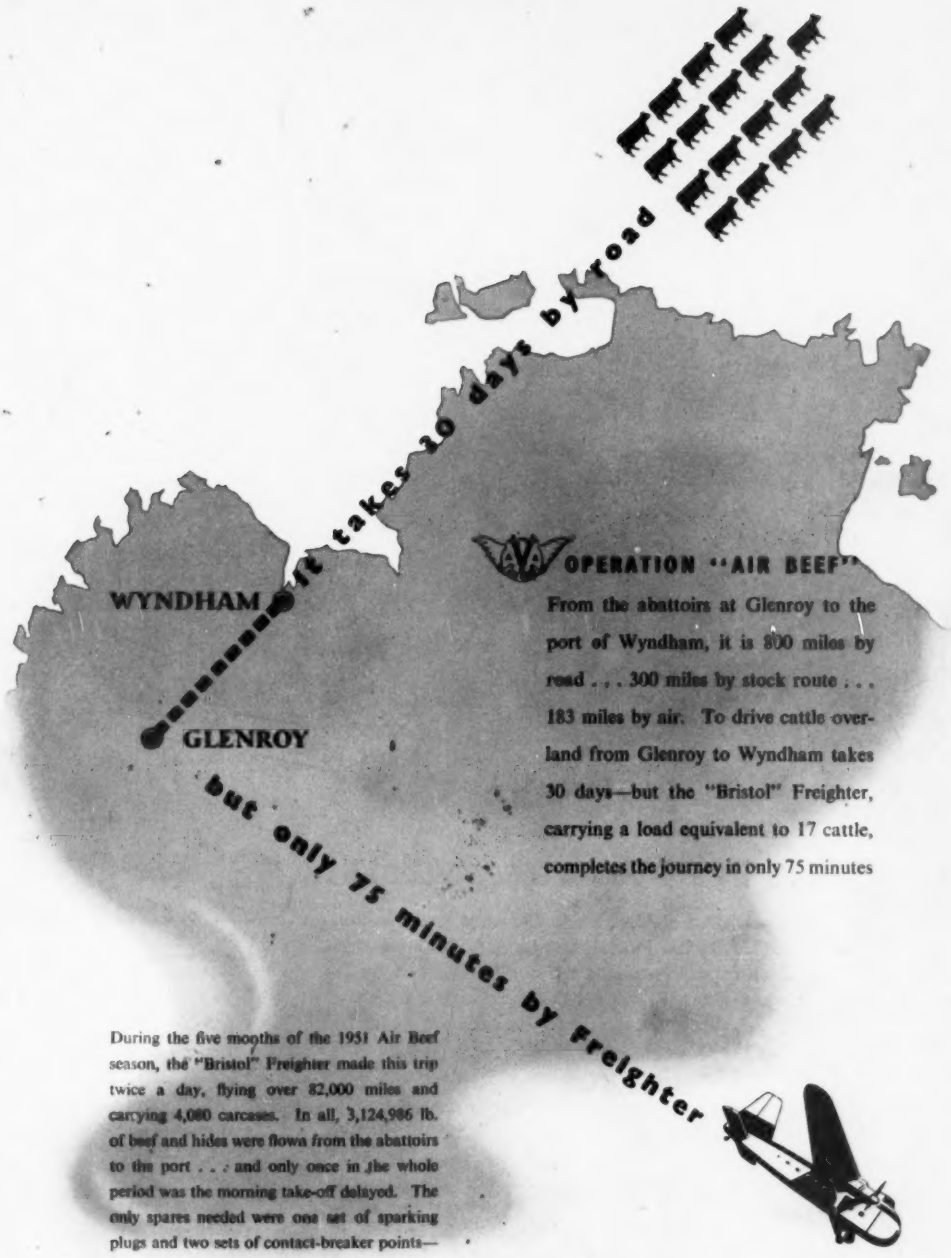

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